

OIL SPILL PREVENTION + RESPONSE



API D3 SUBSEA DISPERSANTS INJECTION PROGRAM

May 31, 2016



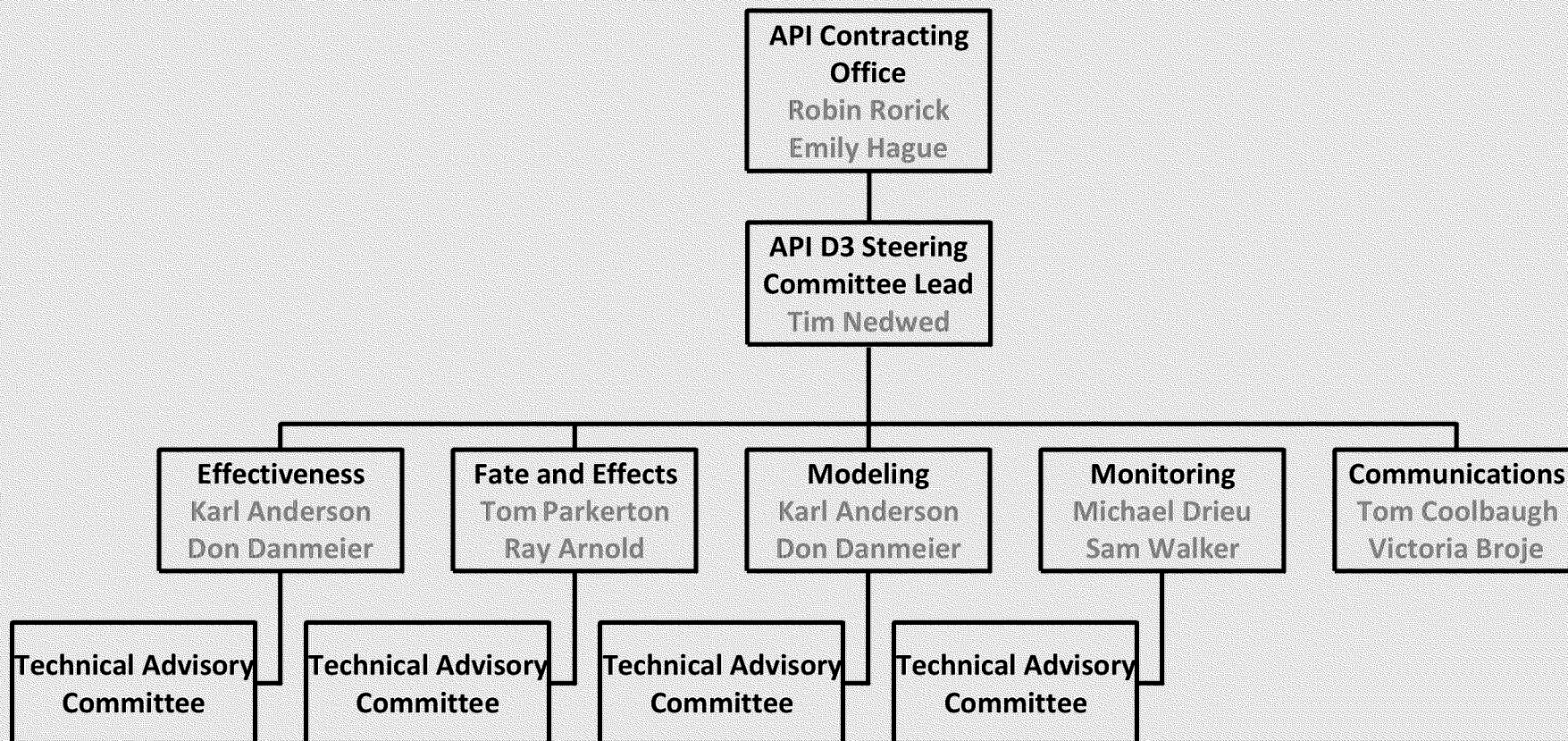


AGENDA

- Welcome
- Overview of D3 Program Structure & Projects
- Project Area Updates
 - Effectiveness
 - Modeling
 - Fate & Effects
 - Monitoring
- API New Project Initiatives
- Communication and Outreach Efforts



API D3 STEERING COMMITTEE





TECHNICAL ADVISORY COMMITTEES

API D3 Team Committees

Effectiveness Industry Members		Modeling Industry Members		Fate & Effects Industry Members		Monitoring Industry Members	
Cort Cooper	Chevron	Cort Cooper	Chevron	Tom Parkerton	ExxonMobil	Mike Drieu	Anadarko
Oliver Pelz	BP	Karl Anderson	Shell	Ray Arnold	Chevron	Sam Walker	BP
Karl Anderson	Shell	Victoria Broje	Shell	Anne Basseres	Total	Victoria Broje	Shell
Victoria Broje	Shell	Karina Heitnes Hofstad	Statoil	Rene Bernier	Chevron	Will Gala	Chevron
Karina Heitnes Hofstad	Statoil			Amanda Bess	Chevron	Kathryn Maness	Anadarko
				Victoria Broje	Shell	Tom McKeever	Statoil
				Christian Collin-Hansen	Statoil		
				Karina Heitnes Hofstad	Statoil		
				Oliver Pelz	BP		
				Jonathan Naile	Shell		
				Roger Prince	ExxonMobil		
Effectiveness TAC		Modeling TAC		Fate & Effects TAC		Monitoring TAC	
Rebecca Green	BOEM	Rebecca Green	BOEM	Yvonne Addassi	CA OSPR	Robyn Comny	EPA
Steve Masutani	U. of Hawaii	Glen Watabayashi	NOAA	Alan Mearns	NOAA	James Hanzalik	Clean Gulf Assoc
Scott Socolofsky	TAMU	Tamay Ozgokmen	U. of Miami	John Pardue	LSU	Steve Lehmann	NOAA
Timothy Steffek	BSEE			Pat Roscigno	BOEM	Pat Roscigno	BOEM
Glen Watabayashi	NOAA			Bill Stubblefield	Oregon State	Roger Sheuermann	HWCG
				Robyn Comny	EPA		



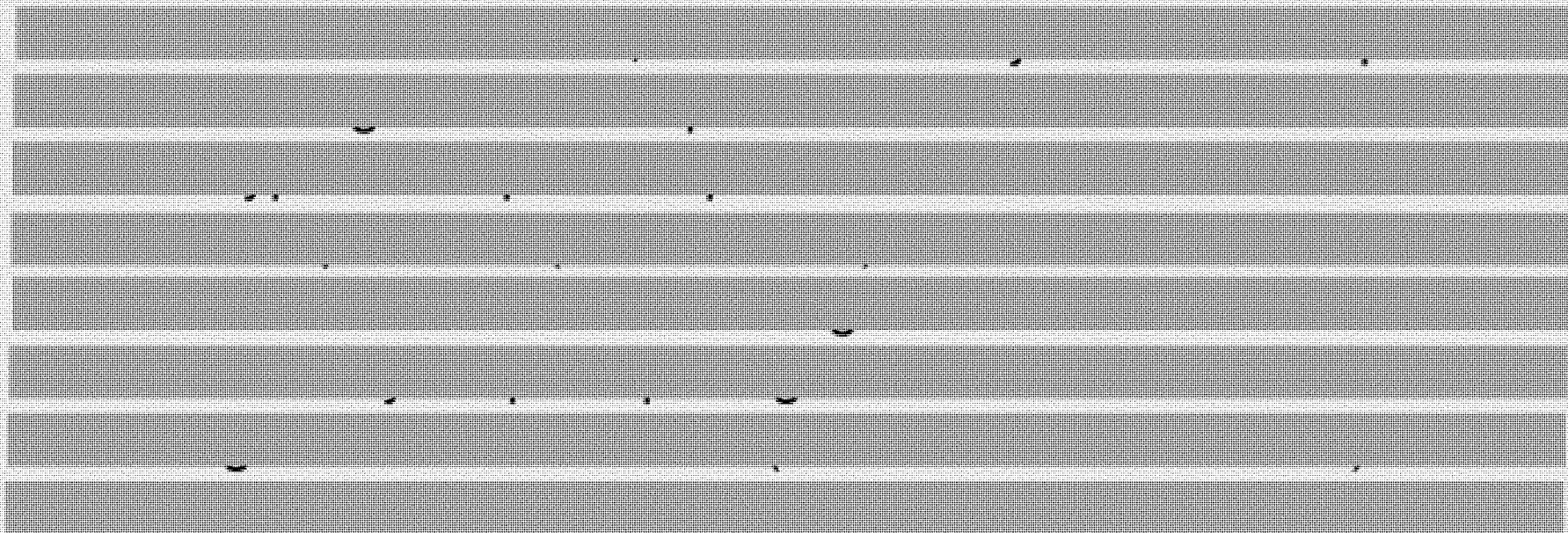
PROJECT UPDATES



EFFECTIVENESS TEAM

SSDI R&D program overview

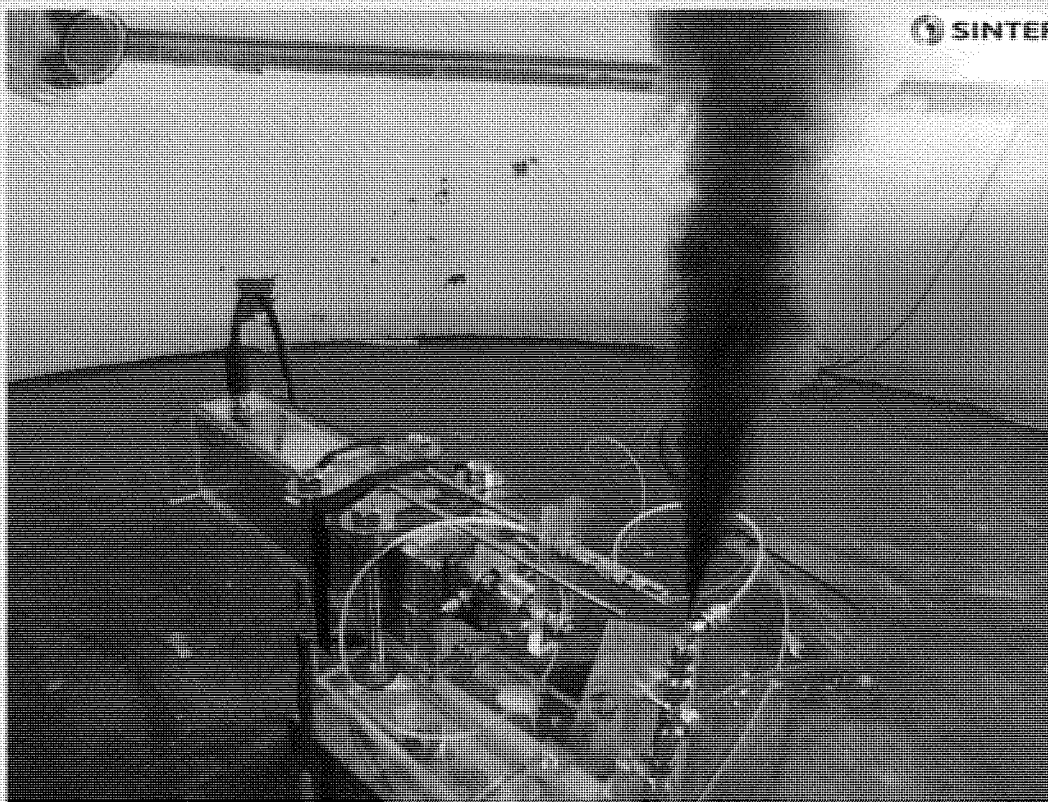
Research topics 2013-16:





EFFECTIVENESS TEAM

Studies of Initial oil droplet formation

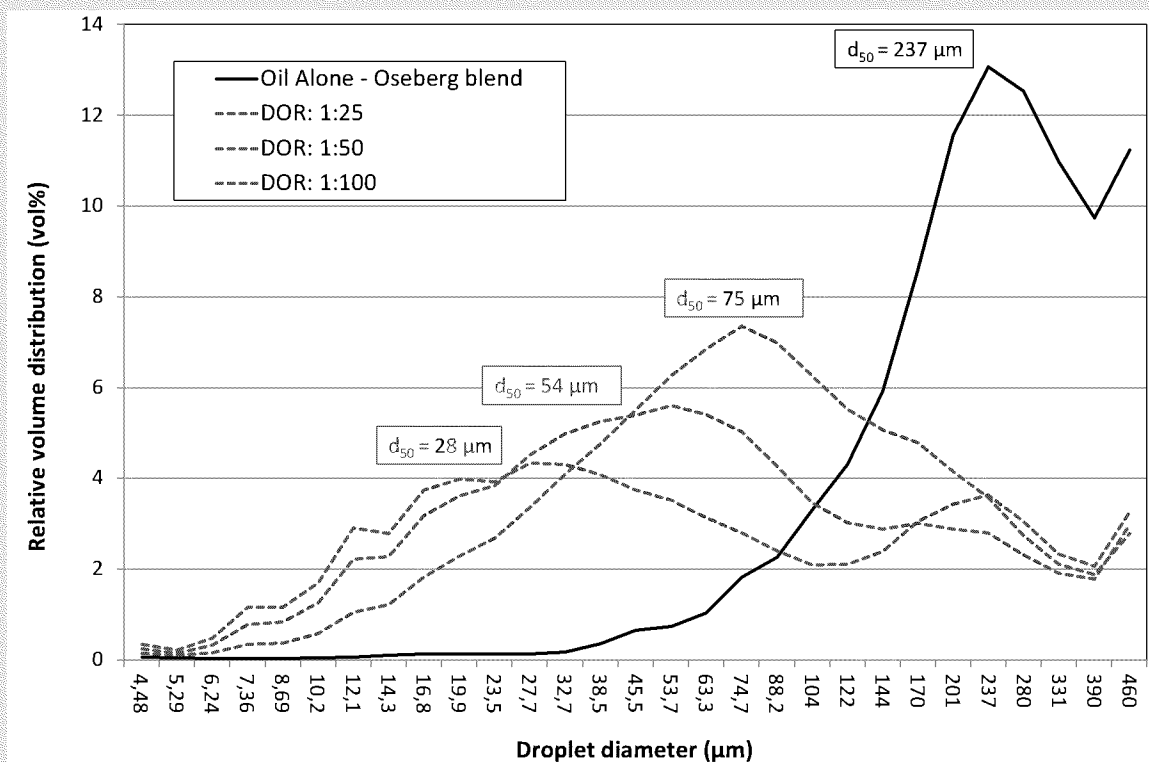


Subsea release of oil (Nozzle: 1.5 mm, 1.5 L/min), dispersant injection (1% C9500) SINTEF Tower Basin



EFFECTIVENESS TEAM

SSDI effectiveness – Reducing oil droplet sizes

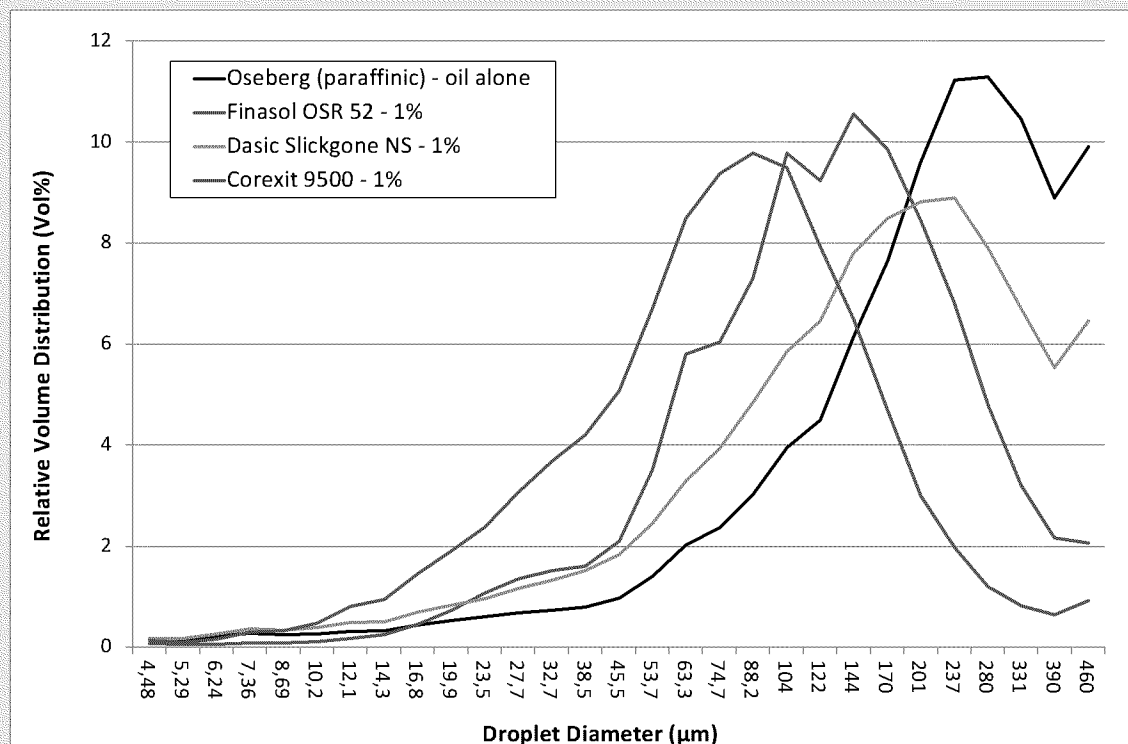


Relative droplet size distributions with dispersant injected on the Oseberg oil. Corexit 9500 at 1, 2 and 4%.



EFFECTIVENESS TEAM

SSDI effectiveness – Different products



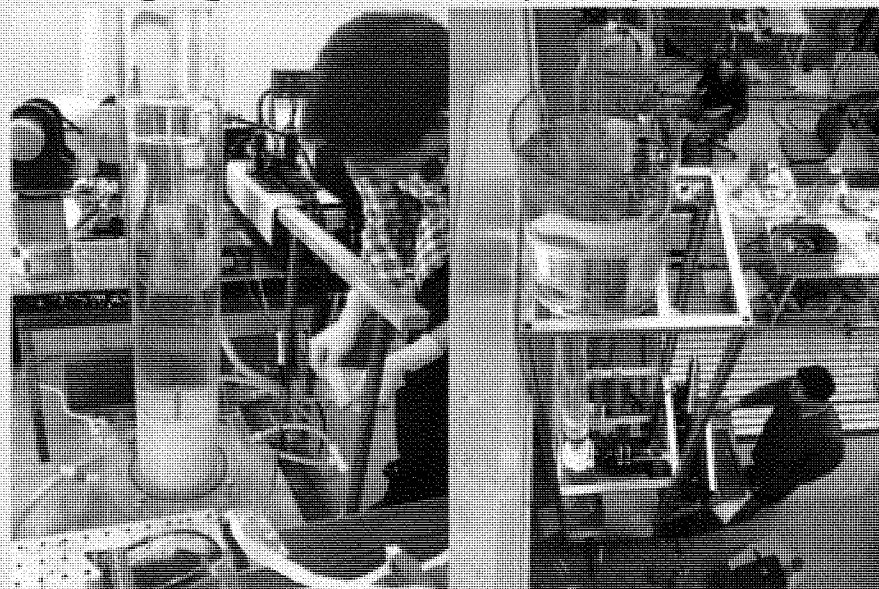
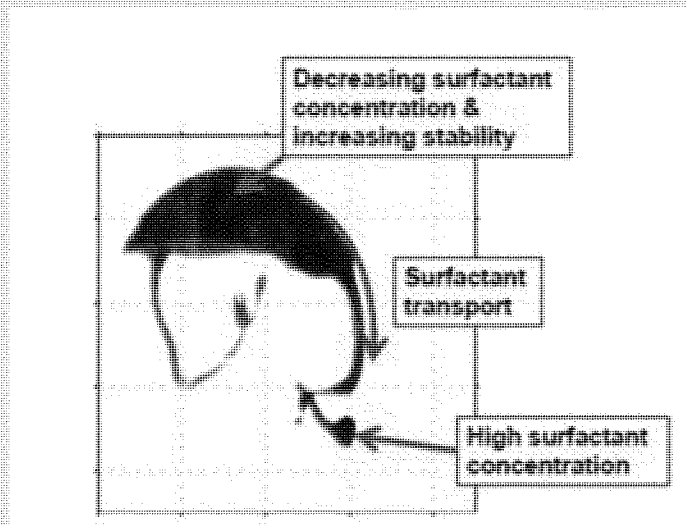
Relative droplet size distributions (volume %) as a function of dispersant type (Corexit® 9500, Finasol® 52 and Dasic® Slickgone NS) with Oseberg blend. Release conditions 1.5 mm, 1.2 L/min, 1% disp and SIT injection



EFFECTIVENESS TEAM

Phase 4 – Tip Streaming and Secondary Breakup (Sintef & U. of HI)

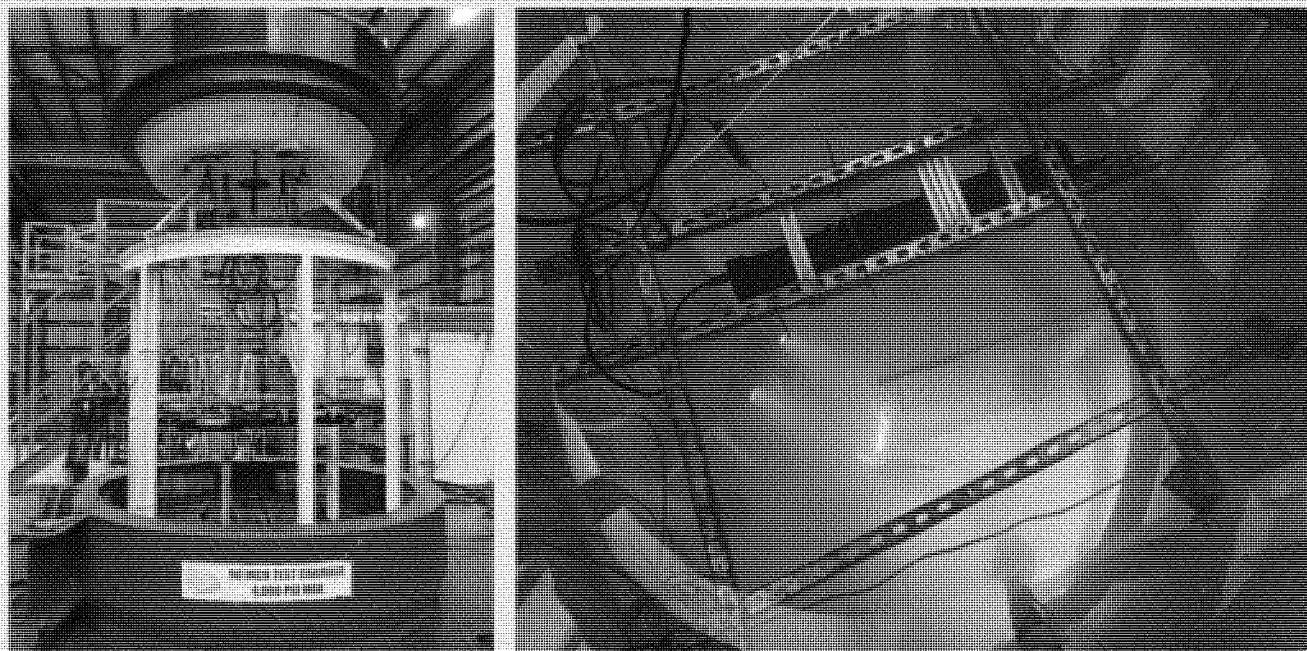
Objective: Investigating the behavior of both oil and dispersed oil droplets as they rise in the water column after exiting the turbulent jet phase especially tip streaming. Work still ongoing. Draft technical report expected Summer 2016.





EFFECTIVENESS TEAM

High Pressure testing at SwRI

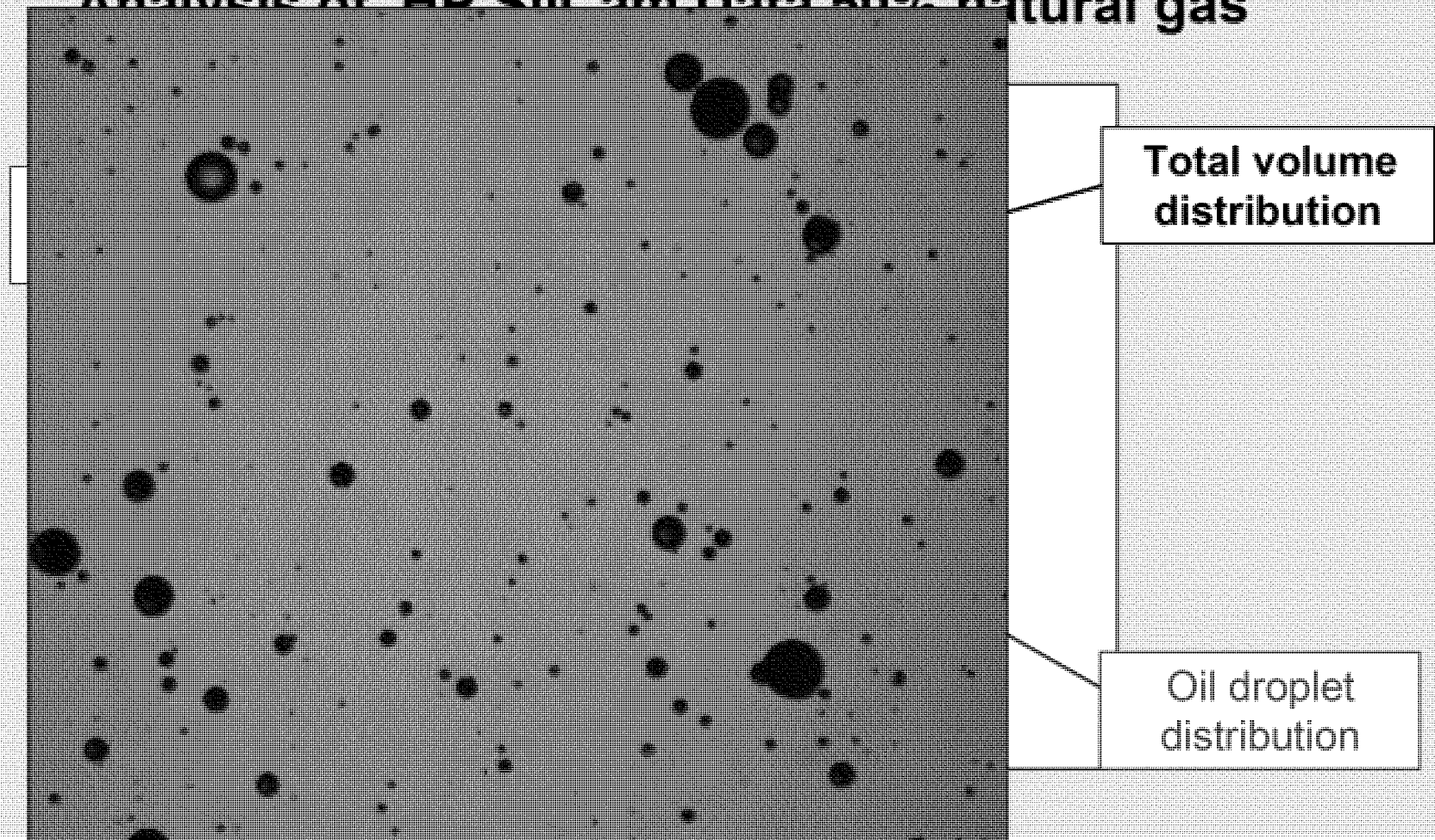


The 90 inch chamber with the frame holding the release nozzles (left) and the monitoring equipment seen from above (right) showing the Silhouette camera mounted above the release nozzle at the bottom.



EFFECTIVENESS TEAM

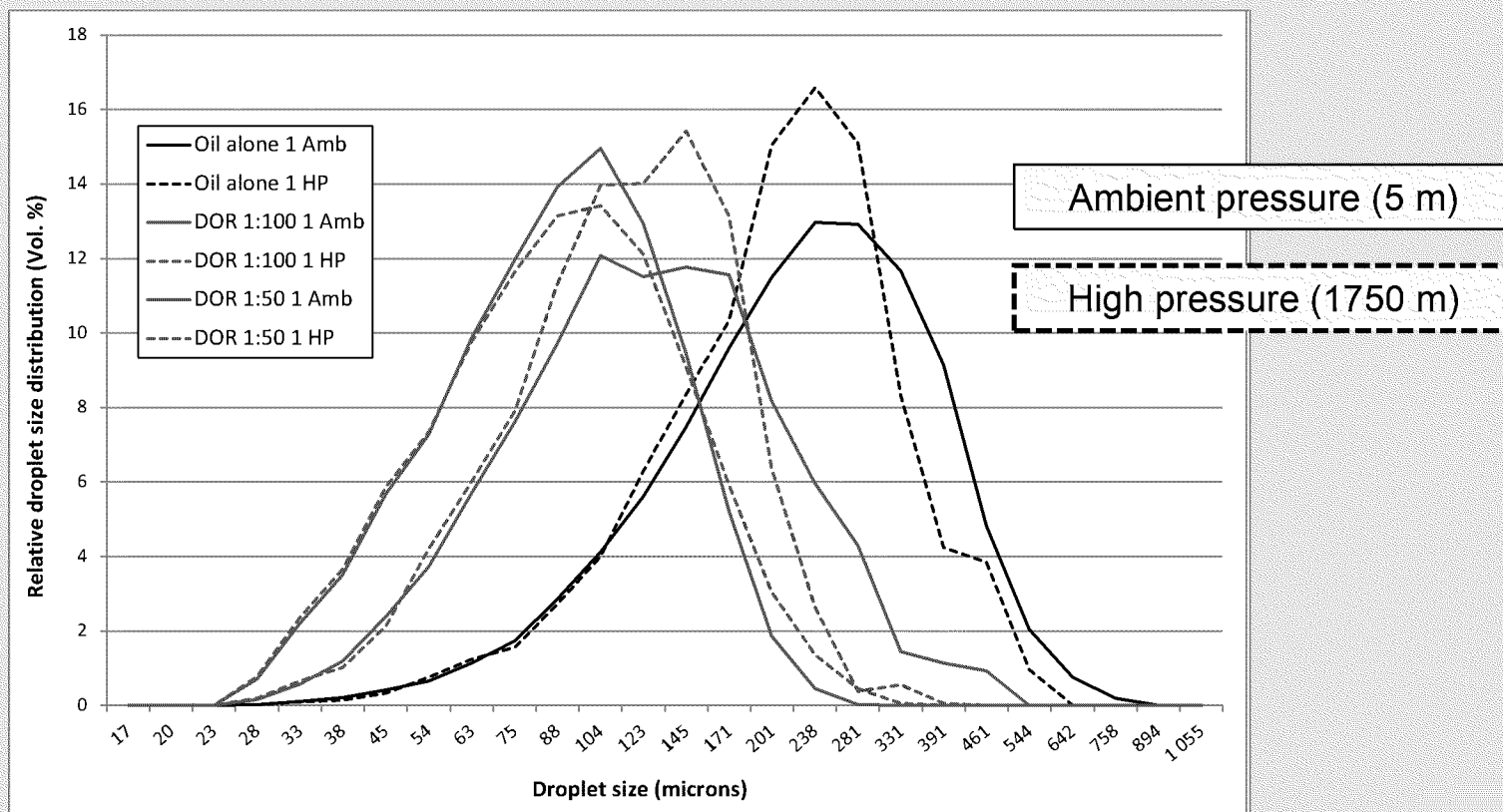
Analysis of HP SilCam Data 50% natural gas





EFFECTIVENESS TEAM

Constant High Pressure – "dead" oil



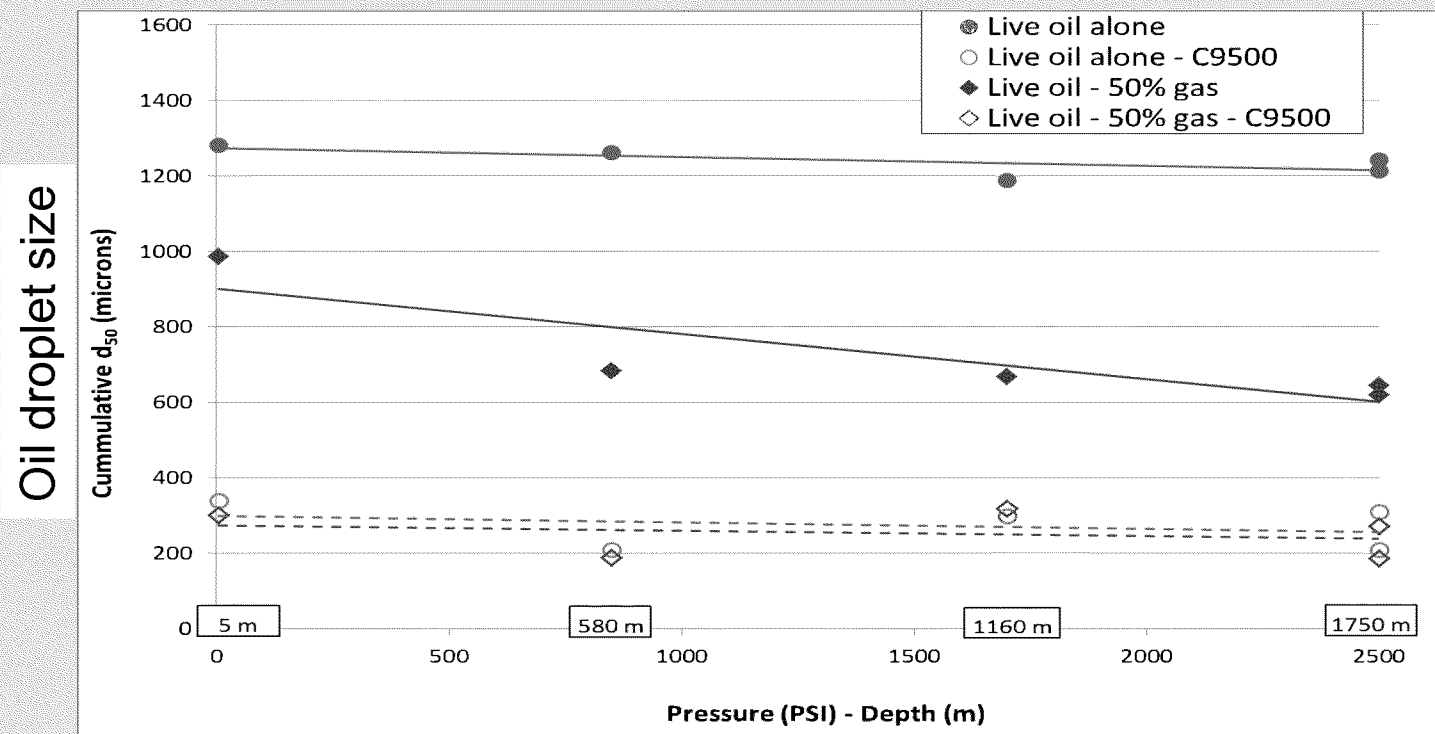
Oil droplet sizes (microns) as a function of dispersant treatment and pressure



EFFECTIVENESS TEAM

Effect of Pressure on “Dead” and “Live” Oil (Phase 3 & Phase 5, Sintef & SWRI)

Findings: Tested dead and live oil at high-pressure Southwest Research Institute facility. Still writing draft report but initial results show dispersant effectiveness remains high in deep water. Weber # model holds for live oils.

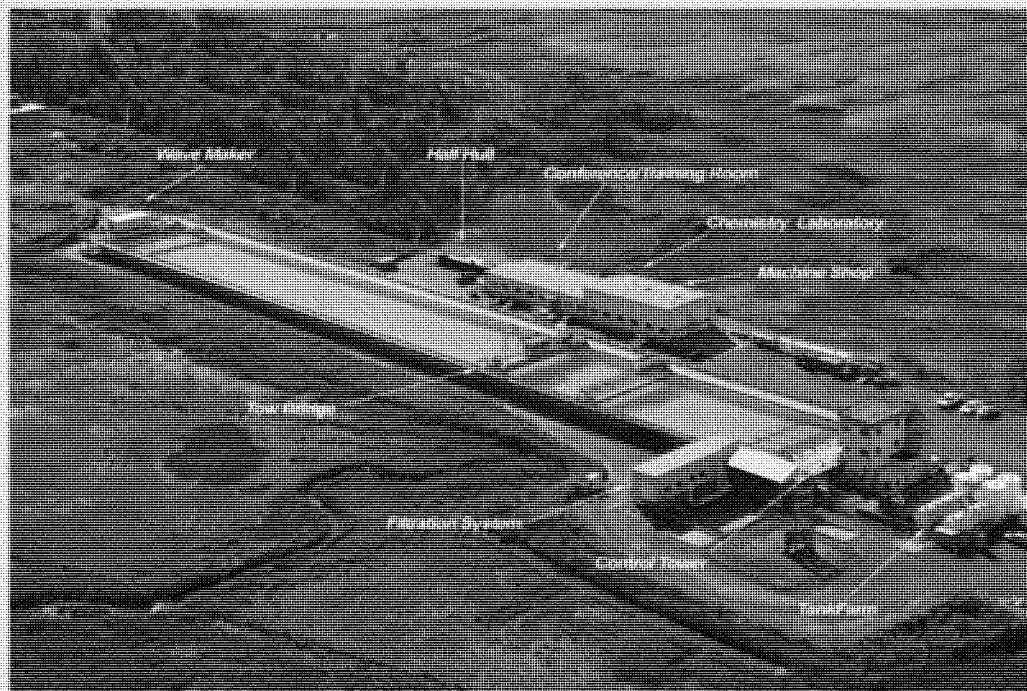


Oil droplet sizes as a function of depth (pressure) and dispersant injection.



EFFECTIVENESS TEAM

Large-scale testing at Ohmsett, NJ, USA US Bureau of Safety and Environmental Enforcement (BSEE) Facility

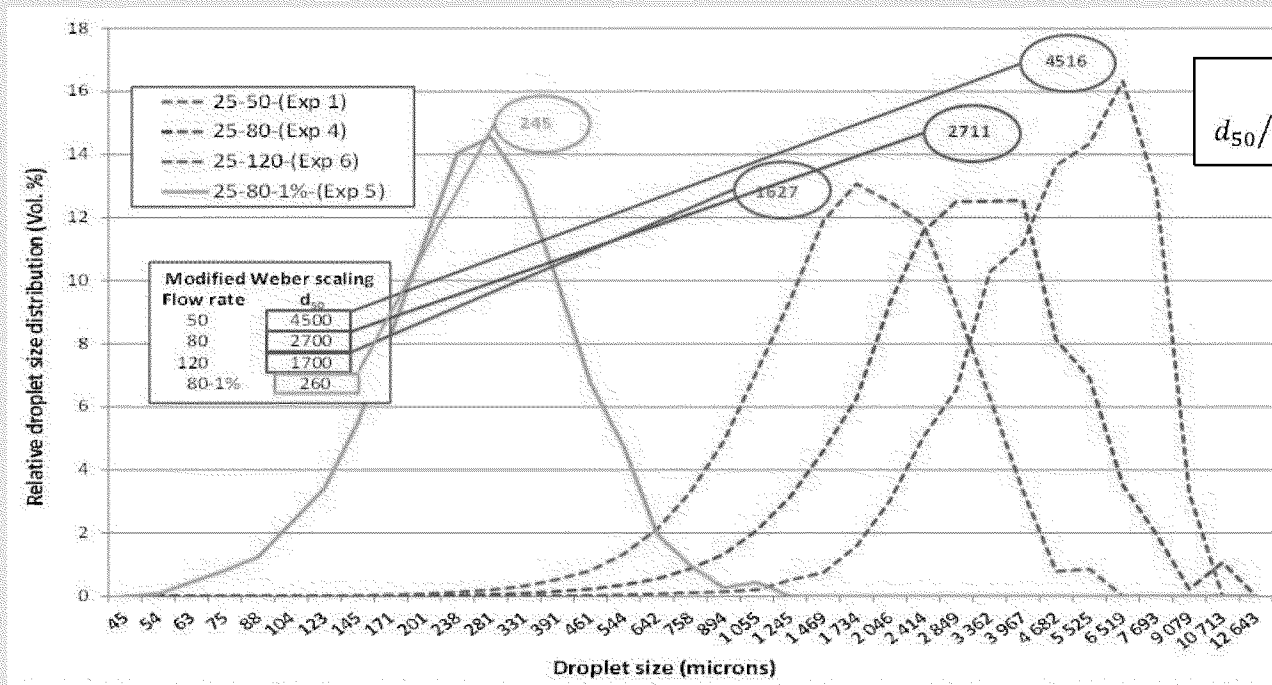


Ohmsett test tank: Length 200 m, width 20 m, depth 2.4 m and 9 500 m³ of sea water.



EFFECTIVENESS TEAM

Predicted vs. measured oil droplet sizes



Modified Weber No.

$$d_{50}/D = 24.6 We^{-3/5} \left[1 + 0.08 Vi \left(\frac{d_{50}}{D} \right)^{1/3} \right]^{3/5}$$

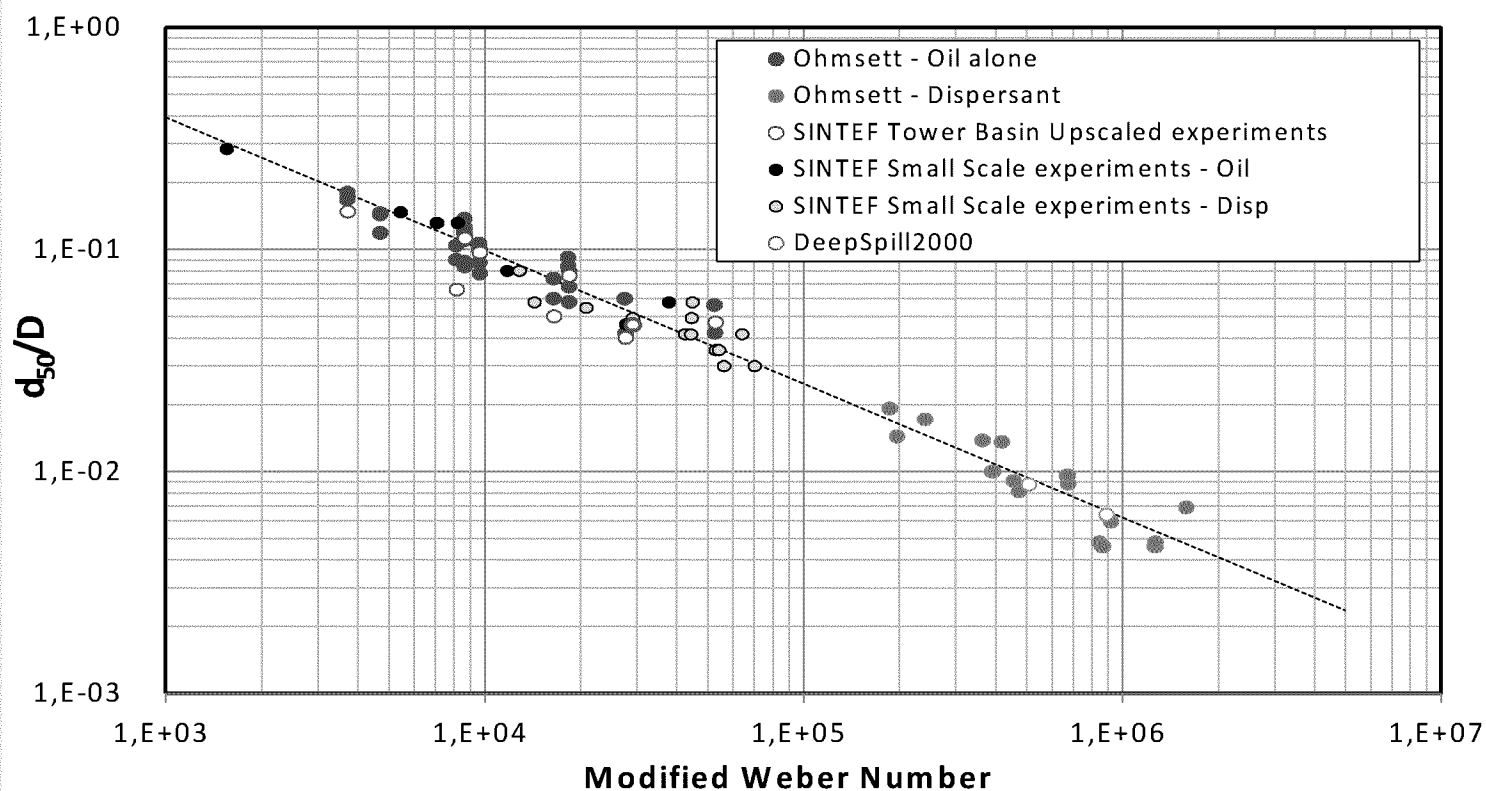
where d_{50} is the median oil droplet size, D is the orifice diameter, 24.6 and 0.08 are empirical coefficients derived by fitting the lab results, We is the exit Weber number ($\rho U^2 D / \sigma$), ρ is the oil density, U is the exit velocity, σ is the IFT, Vi is the Viscosity number ($\mu U / \sigma$), and μ is the dynamic viscosity of oil

Oil droplet sizes (mm) as a function of nozzle size, flow rate and dispersant injection



EFFECTIVENESS TEAM

New algorithms – Modified Weber scaling



Modified Weber plot of droplet size data. Nozzle sizes: 0.5 – 500 mm & Oil flow rates: 0.1 – 300 L/min.



Main Conclusions

- SSDI significantly reduce oil droplet sizes
- Effectiveness dependent on oil types, dispersant & dosage.
- Lab experiments improved dispersant injection techniques.
- New approach for predicting droplet sizes (modified Weber).
- Contradict work by others, Paris et al. (2012) & Aman et al. (2015), who conclude that SSDI during the Deep Water Horizon spill was unnecessary due to initial small oil droplets.
- SSDI effectiveness NOT dependent on pressure
- Developed new monitoring equipment (droplets & bubbles)
- Support the use of SSDI as a contingency method



MODELING

Phase 1 Droplet Model evaluation (Adams, Socolofsky, Boufadel)

Findings: Project reviewed available oil droplet formation models and team concluded that the SINTEF modified Weber number model had a good theoretical basis to calculate the average initial droplet size from a blow-out. The simple model also compared well with existing observations though the issue of how well it would up-scale to full field conditions remained an open question at the time.

Phase 2 Integrated Model Comparison(Socolofsky & Adams)

Findings: Compared six important integrated models (eg OSCAR, OilMap). The modelers were asked to run a series of 18 simple but realistic cases. Results were reviewed at a workshop in which all the modelers participated. Comparisons showed that the most important models (OSCAR, OilMap, and GNOME) gave physically reasonable results with few major deviations from each other. Two of the six models deviated substantially from reality. Results have been documented in a peerreviewed journal article.

Development of VDROD-J Model (Boufadel)

Objective: The goal is to develop an improved droplet model known as VDROD which has much more complex physics than the Sintef model. VDROD has been validated with observations made at the DWH, published Sintef lab results, and DeepSpill. API is sharing with the modelers the observations from JITF Effectiveness Phases 1-6 to further expand and test VDROD.



FATE AND EFFECTS

Biodegradation 1 - State-of-the-knowledge review on biodegradation of dispersed oil in deep waters; Determining the need for high pressure laboratory tests (T Hazen, Univ. Tennessee)

Findings: Critical peer-reviewed paper published as feature article in ES&T documenting that oil degrading microorganisms occur even in extreme marine environments that are cold and under high pressure; Microbial communities can rapidly shift to hydrocarbon degraders; Oil diluted to realistic concentrations expected to biodegrade in deep waters. No critical need for high pressure tests identified for D3 program given project scope, available information and further on-going research on this topic.

Toxicity 1A – Literature and Model Review on Aquatic Toxicity of Gas Molecules (J McGrath, HDR)

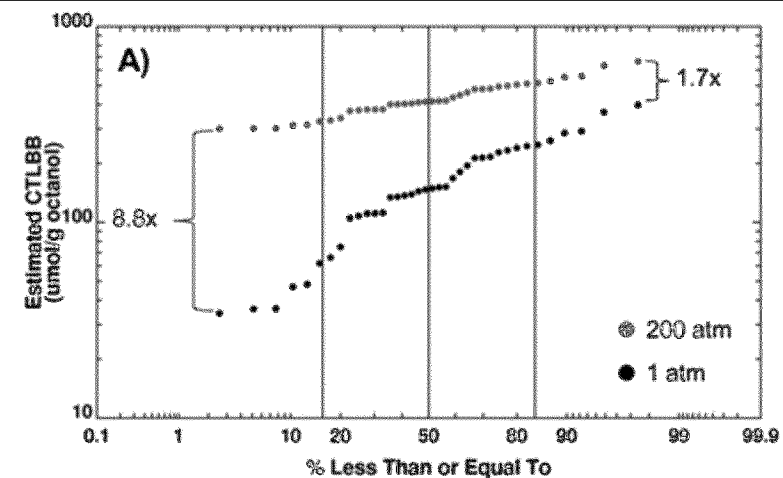
Findings: Aquatic toxicity data not available for dissolved gases; Extension of the target lipid model (TLM) was used to estimate the aquatic toxicity of gases; TLM was also modified to incorporate mitigating effect of pressure on toxicity based on the modeling work completed in 1B.

Toxicity 1B – Literature and Model Review on Role of Pressure on Hydrocarbon Aquatic Toxicity (P Paquin, HDR)

Findings: Toxicity data for gases/liquids tested at different pressures compiled and used to calibrate a mechanistic model that successfully described the combined effects of test substance exposure and pressure based on biological membrane volume changes; toxicity testing of baro-tolerant deep sea species at ambient pressure likely conservative avoiding safety concerns / costs for toxicity tests at elevated pressure

Dissolved Gas	<i>Daphnia</i> EC ₅₀ (mg/L)	HC ₅ (mg/L)
methane	110*	2.42
ethane	91*	1.98
propane	40	0.86
butane	25	0.53

* Above solubility limit at standard conditions





FATE AND EFFECTS

Toxicity4A – Understanding Exposure to Oil Components at Depth (J Sørensen, DHI)

Findings: Dissolved oil component exposures predicted from several deepsea blow-out scenarios (see table) were simulated using the SINTEF OSCAR model and coupled to the TLM effect model that included dissolved gas and pressure-dependent toxicity; Results showed dissolved gases have a limited role (< 1.4%) in contributing to predicted oil toxic units (TUs) across spill scenarios investigated

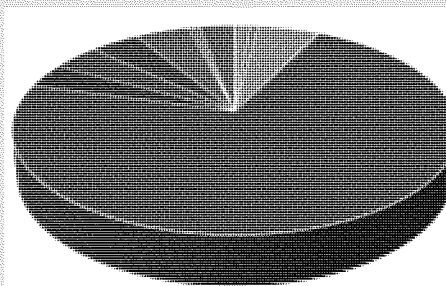
SINTEF simulations

Case	Description	Gas-Oil Ratio (GOR) [scf/bbl]	Dispersant Oil Ratio (DOR) [%]	Depth [m]	Ocean Velocity [m/s]
1	Deep base case	2000	0	2000	0.05
2	Deep base case, with dispersant	2000	2	2000	0.05
3	Low GOR	500	0	2000	0.05
4	Low GOR, with dispersant	500	2	2000	0.05
7	High ocean current	2000	0	2000	0.3
8	High ocean current, with dispersant	2000	2	2000	0.3

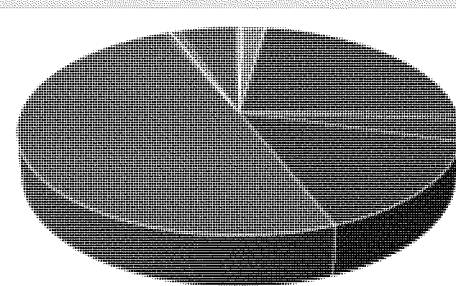
Gas contribution (%) to the overall TU of the oil.

Distance from release point (km)	Case 1	Case 2	Case 3	Case 4	Case 7	Case 8
0	1.4	0.3	0.8	0.2	0.7	0.3
1	1.3	0.3	0.7	0.2	0.7	0.3
3	1.1	0.3	0.7	0.2	0.7	0.3
5	0.9	0.3	0.7	0.2	0.7	0.3
10	0.6	0.2	0.6	0.2	0.7	0.2
20	0.3	0.1	0.4	0.1	0.6	0.2
30	0.1	0.1	0.3	0.1	0.6	0.2
40	0.1	0.0	0.2	0.1	0.6	0.2
50	0.0	0.0	0.1	0.0	0.5	0.2
100	0.0	0.0	0.0	0.0	0.4	0.1

% Contribution of Dissolved Oil Components to Toxic Units



no dispersant @ 5 km



dispersant @ 5 km

- benzene
- c1-c4 dissolved
- c3_Benzene
- c5_saturates
- c7_saturates
- c9_saturates
- c11 - c12 (total sat + aro)
- c15 - c16 (total sat + aro)
- c19 - c20 (total sat + aro)
- c25+
- naphthalenes 2
- PAH2

- c1_Benzene (Toluene)
- c2_Benzene (xylenes)
- c4 and c4_Benzenes
- c6_saturates
- c8_saturates
- c10_saturates
- c13 - c14 (total sat + aro)
- c17 - c18 (total sat + aro)
- c21 - c25 (total sat + aro)
- naphthalenes 1
- PAH1

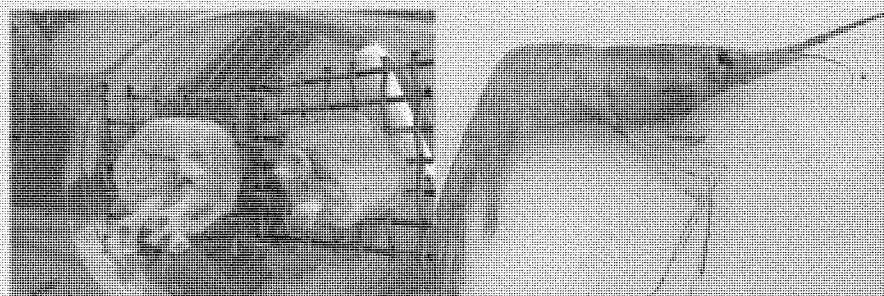


FATE AND EFFECTS

Toxicity 2A – Species Sensitivity Distribution Check for Deep Sea Species; Toxicity 2B – Toxicity of Deep Sea Species to Dispersed Crude Oil (L Camus, Akvaplan Niva, A Volety, Univ North Carolina, J Guyomarchy, CEDRE)

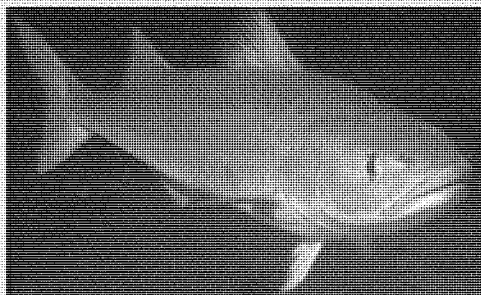
Objectives:

- Conduct toxicity tests using constant, single hydrocarbon (toluene, methyl naphthalene, phenanthrene) and dispersant (Corexit 9500) exposures for baro-tolerant species (coral, shrimp, sablefish) at 1 atm pressure; Use data to assess relative species sensitivity
- Conduct additional physically and chemically dispersed oil toxicity tests at 1 atm with two deep sea species

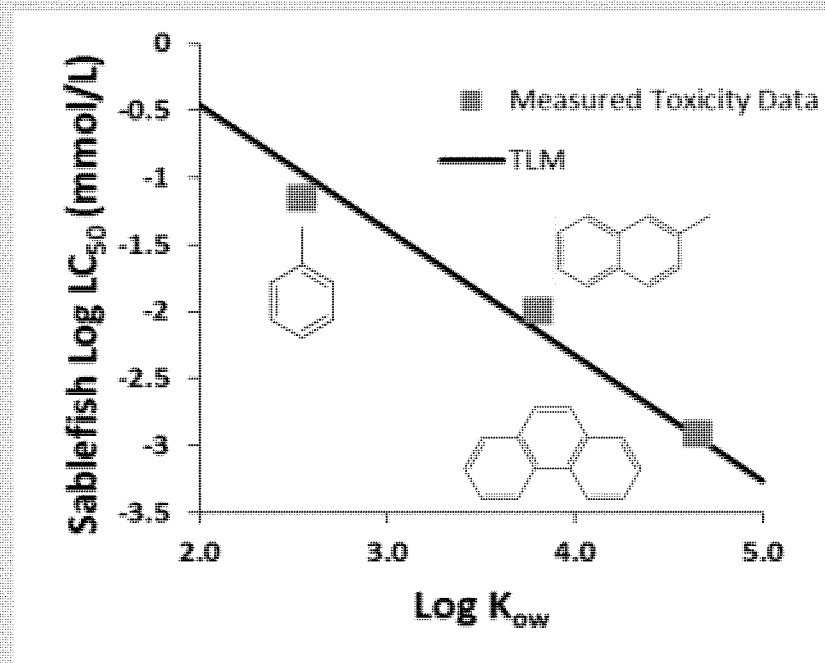


Lophelia pertusa

Pandalus borealis



Anoplopoma fimbria





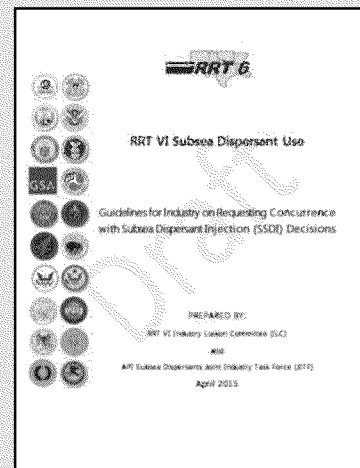
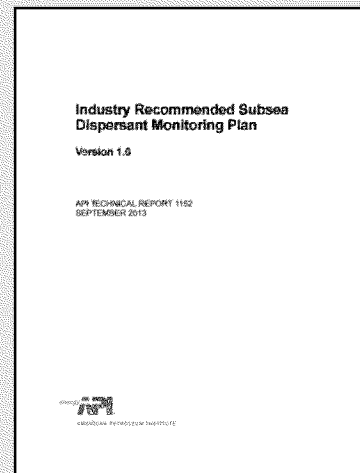
MONITORING

Subsea Dispersants Monitoring Guidance – API Technical Report 1152, *Industry Recommended Subsea Dispersant Monitoring Plan*

Project Outcomes: The guidance describes a proposed method for monitoring the efficacy and character of subsea dispersant injection to inform operational oil spill response decision-making and Unified Command (UC) strategies for protecting worker health and safety. Project involved reviewing available oil droplet formation models.

Subsea Dispersants Use Plan

Project Outcomes: The Monitoring Team developed, with substantial input from Federal and state regulators, a draft document titled Guidelines for Industry on Subsea Dispersant Use and Requesting Regulatory Concurrence. These guidelines outlined a standardized process through which a responsible party could request permission from governmental authorities to apply dispersants directly at the site of a subsea well blowout. API is standing up a task group to shepherd this document through the API Recommended Practice process to finalize the document.





D3 NEW PROJECT INITIATIVES

VOC Study (D3 Effectiveness Team; Contractor– RPS)

Objective: To perform a study to assess atmospheric concentrations of volatile organic compounds (VOCs) associated with various subseadispersant treatment options of a subsea oil and gas well blowout. This study will evaluate the fate of released oil and gas from a subsea blowout with respect to the associated atmospheric concentrations focused on eight specific VOC constituents for various subsurface dispersant treatment options.

Marine Snow (D3 Monitoring Team; Contractor– SINTEF)

Objective: To examine the current state of the science relating to the drivers of “marine snow” formation in the context of oil spills and oil spill response techniques, as well as to better understand the dynamics, fate and environmental impacts resulting from the formation of marine snow. The results will be used to identify potential gaps in knowledge (or relevant areas of ongoing scientific debate), provide recommendations on refinements to model development, and strengthen the value of the NEBA approach in the context of oil spill response decision making.

Cod Larvae Oil Toxicity Testing (D3 Fate & Effects Team; Contractor– SINTEF)

Objective: Studies investigating the survival and growth of cod larvae exposed to dissolved and dissolved+droplet oil have been performed by SINTEF with and without dispersants to assess the role of different size droplets in contributing to toxicity. This project will publish these studies and also use detailed WAF chemistry to determine toxic unit of dissolved oil using the TLM to determine if this exposure metric better describes observed effects across treatments.

Improving Modeling of Degradation Processes (D3 Fate & Effects Team; Contractors– E Adams, S. Socolofsky, E North, and M Boufadel)

Objective: Conduct review of different oil spill models to compare assumptions on how biotic and abiotic degradation processes are quantified; Develop report providing recommendations for facilitating greater consistency in quantifying degradation processes across models that reflects collective experience as well as recent research.



COMMUNICATION & OUTREACH EFFORTS

- D3 & API JITF Newsletters
- Multiple Conference Presentations, including:
 - Interspill 2015
 - Clean Gulf Conferences 2012, 2013, 2014 and 2015
 - GOMRI Conferences 2013, 2014 & 2015
 - IOSC 2014
 - ACS National Meeting 2013
- Project Technical Reports available at API's www.oilspillprevention.org



SOME AVAILABLE PUBLICATIONS

EFFECTIVENESS PROJECTS

- Effectiveness Phase 1 Technical Report: <http://www.oilspillprevention.org/~media/Oil-Spill-Prevention/spillprevention/r-and-d/dispersants/sintef-api-d3-phase-i-effectiveness-repo.pdf>
- Effectiveness Phase 2 Technical Report: <http://www.oilspillprevention.org/~media/Oil-Spill-Prevention/spillprevention/r-and-d/dispersants/sintef-api-d3-phase-ii-final-report-a268.pdf>
- Effectiveness Phase 3 Technical Report: <http://www.oilspillprevention.org/~media/Oil-Spill-Prevention/spillprevention/r-and-d/dispersants/sintef-api-d3-phase-iii-hp-testing-repor.pdf>
- Publication in SPE Journal: https://www.onepetro.org/conference-paper/SPE-179401-MS?sort=&start=0&q=author%3A%22Brandvik%22&from_year=&peer_reviewed=&published_between=&fromSearchResults=true&to_year=&rows=10#

FATE AND EFFECTS PROJECTS

- *Marine Oil Biodegradation*. Terry C. Hazen, Roger C. Prince, and Nagissa Mahmoudi. Environmental Science & Technology 2016 50 (5), 2121-2129: <http://pubs.acs.org/doi/abs/10.1021/acs.est.5b03333>

MODELING PROJECTS

- *Intercomparison of oil spill prediction models for accidental blowout scenarios with and without subsea chemical dispersant injection*. Socolofsky, et al. Marine Pollution Bulletin, Volume 96, Issues 1–2, 15 July 2015, Pages 110–126: <http://www.sciencedirect.com/science/article/pii/S0025326X15002969>

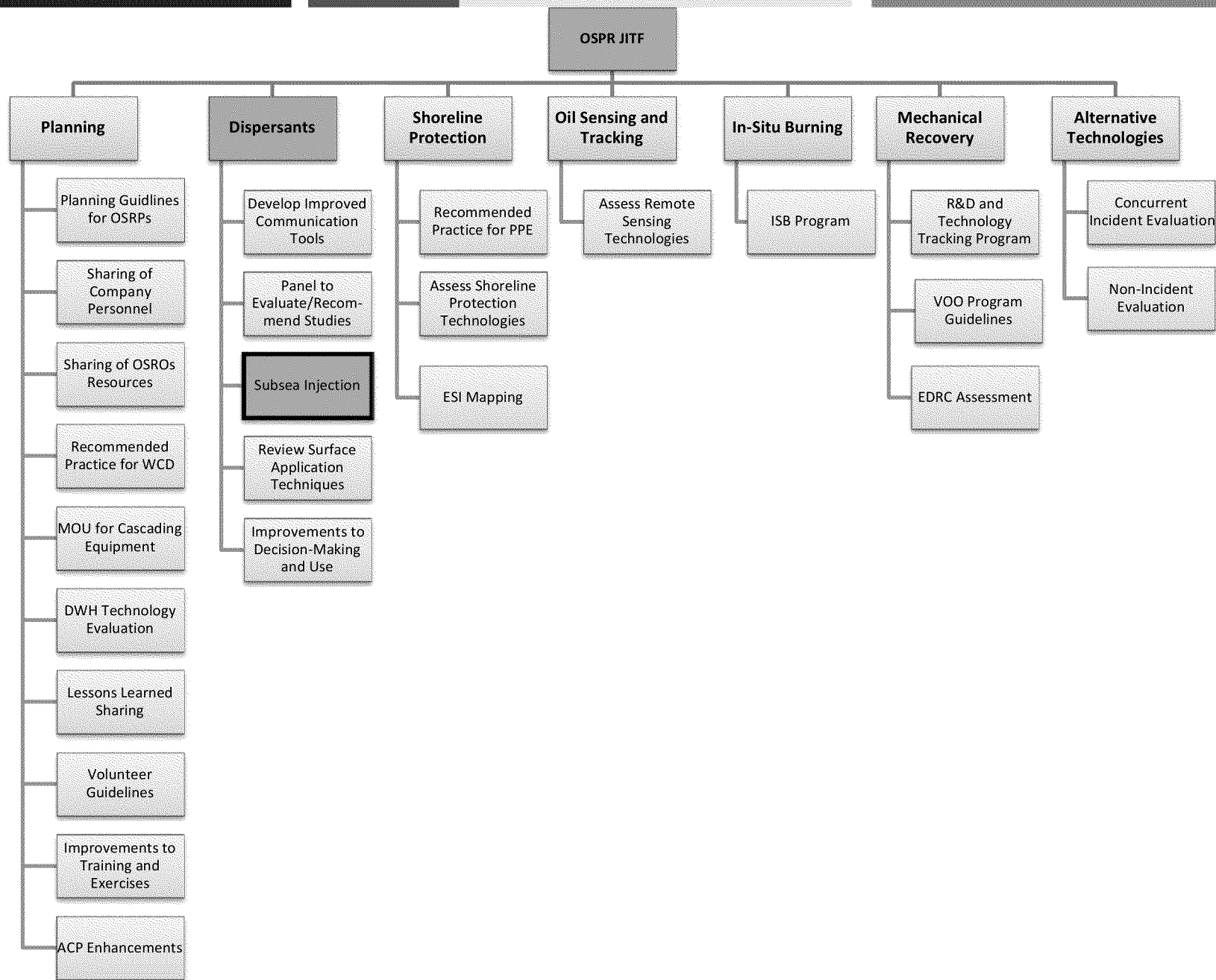
MONITORING PROJECTS

- Industry Recommended Subsea Dispersant Monitoring Plan. API Technical Report 1152, September 2013: <http://www.oilspillprevention.org/~media/Oil-Spill-Prevention/spillprevention/r-and-d/dispersants/api-1152-industry-recommended-subsea-dis.pdf>



THANK YOU!

Any Questions?



To: Zhuang, Mobing (zhuangmg)[zhuangmg@mail.uc.edu]; Zhang, Yu (zhang4y5)[zhang4y5@mail.uc.edu]; Sundaravadivelu, Devi[sundaravadivelu.devi@epa.gov]
Cc: Conmy, Robyn[Conmy.Robyn@epa.gov]; Venkatapathy, Raghuraman[Venkatapathy.Raghuraman@epa.gov]; Holder, Edith[holder.edith@epa.gov]; SantoDomingo, Jorge[Santodomingo.Jorge@epa.gov]
From: Elk, Michael
Sent: Tue 4/12/2016 2:45:41 PM
Subject: RE: Oil Degradation Data- Dispersant project--sequencing data stacked sequencing data_batch 1_batch 2_oil_robyn and pablo_040716.xlsx

All,

Here is all the sequencing data for you to peruse. There are 4 tabs; one for each data set. Let me know if there are any questions/concerns.

Jorge is working with someone at Central Michigan with the analysis as well. I think the plan is to meet in the near future to see what's new and compare notes. Jorge can confirm?

Thanks,

Mike

Michael Elk

Pegasus Technical Services

Onsite contractor to US EPA

NRMRL/WSWRD/MCCB

513-569-7130

From: Zhuang, Mobing (zhuangmg) [mailto:zhuangmg@mail.uc.edu]
Sent: Monday, April 11, 2016 4:31 PM
To: Zhang, Yu (zhang4y5) <zhang4y5@mail.uc.edu>; Sundaravadivelu, Devi <sundaravadivelu.devi@epa.gov>; SantoDomingo, Jorge <Santodomingo.Jorge@epa.gov>; Elk, Michael <Elk.Michael@epa.gov>

Cc: Conmy, Robyn <Conmy.Robyn@epa.gov>; Venkatapathy, Raghuraman <Venkatapathy.Raghuraman@epa.gov>; p.campo-moreno@cranfield.ac.uk; Holder, Edith <holder.edith@epa.gov>
Subject: Re: Oil Degradation Data- Dispersant project

Hi All,

Attached are the oil and DOSS data for the ANS+C9500 experiment.

Thanks!

Regards,

Mobing Zhuang

*PH.D Candidate
Department of Environmental Engineering
University of Cincinnati
Cincinnati, OH 45221*

From: Zhang, Yu (zhang4y5)
Sent: Monday, April 11, 2016 15:38
To: Sundaravadivelu, Devi; Zhuang, Mobing (zhuangmg); SantoDomingo, Jorge; Elk, Michael
Cc: Conmy, Robyn; Venkatapathy, Raghuraman; p.campo-moreno@cranfield.ac.uk; Holder, Edith
Subject: Re: Oil Degradation Data- Dispersant project

Dear All,

Please find the DOSS and oil degradation results for Finasol + ANS experiment in the email. If there's any problem, please let me know.

Regards,

Yu

From: Sundaravadivelu, Devi <sundaravadivelu.devi@epa.gov>
Sent: Thursday, April 7, 2016 3:24 PM
To: Zhuang, Mobing (zhuangmg); Zhang, Yu (zhang4y5); SantoDomingo, Jorge; Elk, Michael
Cc: Conmy, Robyn; Venkatapathy, Raghuraman; p.campo-moreno@cranfield.ac.uk; Holder, Edith
Subject: Oil Degradation Data- Dispersant project

Hi Mobing and Yu,

Could you please send your oil degradation data (normalized and non-normalized) in an excel format so that Jorge and group can continue working on their analysis.

Thanks,

Devi

Devi Sundaravadivelu, Ph.D.

Pegasus Technical Services, Inc.

On-Site Contractor to the U.S. EPA

ORD/NRMRL

26 W. Martin Luther King Dr.

Cincinnati, OH 45268

(585) 732-4101 / (513) 569-7478

To: Conmy, Robyn[Conmy.Robyn@epa.gov]
From: Mike Fulton - NOAA Federal
Sent: Tue 4/12/2016 12:41:23 PM
Subject: Re: purchase fo finasol and corexit

Hi Robyn,
See below contact info for NALCO. You may have more success if you can sign a waiver that you won't use for toxicity testing. Good luck.
Mike

Debby.Theriot@nalco.com

281 263 7709

On Tue, Apr 12, 2016 at 7:58 AM, Conmy, Robyn <Conmy.Robyn@epa.gov> wrote:

Thanks Mike. I spoke to a contact at Total yesterday and we are getting some Finasol. Nalco hasn't responded to a voicemail as of yet, so your contact at Nalco could be a huge help.

[illegible]

Robyn N. Conmy, Ph.D.

Research Ecologist

USEPA/NRMRL/LRPCD

26 West MLK Drive

Cincinnati, Ohio 45268

513-569-7090 (office)

513-431-1970 (EPA mobile)

727-692-5333 (Personal mobile)

conmy.robbyn@epa.gov

From: Mike Fulton - NOAA Federal [mailto:mike.fulton@noaa.gov]
Sent: Monday, April 11, 2016 5:00 PM
To: Conmy, Robyn <Conmy.Robyn@epa.gov>
Subject: Re: purchase fo finasol and corexit

Hi Robyn, Ultimately, We weren't able to get Corexit from Nalco, but I'll get you the contact info for both manufacturers.

On Monday, April 11, 2016, Conmy, Robyn <Conmy.Robyn@epa.gov> wrote:

Hi Mike,

Awhile back we had discussed NOAA's possible procurement of Corexit and Finasol for your toxicity work. Would you mind sharing the POC for Nalco and Total that were contacted in your hunt to procure the dispersants?

Thanks,

Robyn

[illegible]

Robyn N. Conmy, Ph.D.

Research Ecologist

USEPA/NRMRL/LRPCD

26 West MLK Drive

Cincinnati, Ohio 45268

513-569-7090 (office)

513-431-1970 (EPA mobile)

727-692-5333 (Personal mobile)

conmy.robbyn@epa.gov

—

Dr. Michael H. Fulton-Estuaries and Land Use Branch Chief

Center for Coastal Environmental Health and

Biomolecular Research (CCEHBR)

USDOC/NOAA/NOS/NCCOS

219 Fort Johnson Road

Charleston, SC 29412-9110

voice: (843) 762-8576 fax: (843) 762-8700

e-mail: mike.fulton@noaa.gov

--

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e-mail: mike.fulton@noaa.gov

OK, this would be helpful in setting up the LISST and running a couple of samples. And to write up the SOP.

Edie mentioned that you might have a laptop that could be used for the LISST. Could I pick it up from your office sometime today?

On Thu, Apr 7, 2016 at 10:47 AM, Conmy, Robyn <Conmy.Robyn@epa.gov> wrote:

OK – here is what I have from the DFO Canada collaborators on the LISST SOP. It includes data processing within the LISST software, but we will simply do this step in Excel.

[illegible]

Robyn N. Conmy, Ph.D.

Research Ecologist

USEPA/NRMRL/LRPCD

26 West MLK Drive

Cincinnati, Ohio 45268

513-569-7090 (office)

513-431-1970 (EPA mobile)

727-692-5333 (Personal mobile)

conmy.robbyn@epa.gov

From: Devi Sundaravadivelu [mailto:devis.255@gmail.com]

Sent: Thursday, April 07, 2016 10:44 AM

To: Conmy, Robyn <Conmy.Robyn@epa.gov>

Cc: Holder, Edith <holder.edith@epa.gov>

Subject: Re: SOP

Hi Robyn,

I will take a look at it and get back to you.

We only have the LISST manual (from the manufacturer) as of now, but no SOP. We wanted to run a couple of samples to understand the operation before writing something up.

Thanks,

Devi

On Thu, Apr 7, 2016 at 10:35 AM, Conmy, Robyn <Conmy.Robyn@epa.gov> wrote:

Devi,

Here is my first stab at SOP #4 for the WET Labs fluorometer. Take a look and see what needs to be edited. Also, what about a LIST SOP? Did Edie already supply that to you?

I also attached my edits to the body of the QAPP.

Robyn

[illegible]

Robyn N. Conmy, Ph.D.

Research Ecologist

USEPA/NRMRL/LRPCD

26 West MLK Drive

Cincinnati, Ohio 45268

513-569-7090 (office)

513-431-1970 (EPA mobile)

727-692-5333 (Personal mobile)

conmy.robyn@epa.gov

From: Devi Sundaravadivelu [mailto:devis.255@gmail.com]
Sent: Thursday, April 07, 2016 9:26 AM
To: Conmy, Robyn <Conmy.Robyn@epa.gov>
Cc: Sundaravadivelu, Devi <sundaravadivelu.devi@epa.gov>
Subject: Re: SOP

Hi Robyn,

Please see attached.

For SOP 3 (Horiba Benchtop Fluorometer), we have something that was originally written by U.S.EPA NHEERL and it can be modified if necessary,

As for SOP 4 (Wetlabs), it has to be started from scratch.

Thanks,

Devi

On Thu, Apr 7, 2016 at 7:50 AM, Conmy, Robyn <Conmy.Robyn@epa.gov> wrote:

Hi Devi,

I am working on the new QAPP. Edie didn't end along any of the SOPs that

To: Conmy, Robyn[Conmy.Robyn@epa.gov]
From: Mike Fulton - NOAA Federal
Sent: Mon 4/11/2016 9:00:15 PM
Subject: Re: purchase fo finasol and corexit

Hi Robyn, Ultimately, We weren't able to get Corexit from Nalco, but I'll get you the contact info for both manufacturers.

On Monday, April 11, 2016, Conmy, Robyn <Conmy.Robyn@epa.gov> wrote:

Hi Mike,

Awhile back we had discussed NOAA's possible procurement of Corexit and Finasol for your toxicity work. Would you mind sharing the POC for Nalco and Total that were contacted in your hunt to procure the dispersants?

Thanks,

Robyn

[illegible]

Robyn N. Conmy, Ph.D.

Research Ecologist

USEPA/NRMRL/LRPCD

26 West MLK Drive

Cincinnati, Ohio 45268

513-569-7090 (office)

513-431-1970 (EPA mobile)

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conmy.robbyn@epa.gov

--

Dr. Michael H. Fulton-Estuaries and Land Use Branch Chief
Center for Coastal Environmental Health and
Biomolecular Research (CCEHBR)
USDOC/NOAA/NOS/NCCOS
219 Fort Johnson Road
Charleston, SC 29412-9110
voice: (843) 762-8576 fax: (843) 762-8700
e-mail: mike.fulton@noaa.gov

To: Zhang, Yu (zhang4y5)[zhang4y5@mail.uc.edu]; Sundaravadivelu, Devi[sundaravadivelu.devi@epa.gov]; SantoDomingo, Jorge[Santodomingo.Jorge@epa.gov]; Elk, Michael[Elk.Michael@epa.gov]
Cc: Conmy, Robyn[Conmy.Robyn@epa.gov]; Venkatapathy, Raghuraman[Venkatapathy.Raghuraman@epa.gov]; p.campo-moreno@cranfield.ac.uk[p.campo-moreno@cranfield.ac.uk]; Holder, Edith[holder.edith@epa.gov]
From: Zhuang, Mobing (zhuangmg)
Sent: Mon 4/11/2016 8:31:00 PM
Subject: Re: Oil Degradation Data- Dispersant project
[Oil&DOSS Data Batch 01 MobingZhuang.xlsx](#)

Hi All,

Attached are the oil and DOSS data for the ANS+C9500 experiment.

Thanks!

***Regards,
Mobing Zhuang***

PH.D Candidate
Department of Environmental Engineering
University of Cincinnati
Cincinnati, OH 45221

From: Zhang, Yu (zhang4y5)
Sent: Monday, April 11, 2016 15:38
To: Sundaravadivelu, Devi; Zhuang, Mobing (zhuangmg); SantoDomingo, Jorge; Elk, Michael
Cc: Conmy, Robyn; Venkatapathy, Raghuraman; p.campo-moreno@cranfield.ac.uk; Holder, Edith
Subject: Re: Oil Degradation Data- Dispersant project

Dear All,

Please find the DOSS and oil degradation results for Finasol + ANS experiment in the email. If there's any problem, please let me know.

Regards,

Yu

From: Sundaravadivelu, Devi <sundaravadivelu.devi@epa.gov>
Sent: Thursday, April 7, 2016 3:24 PM
To: Zhuang, Mobing (zhuangmg); Zhang, Yu (zhang4y5); SantoDomingo, Jorge; Elk, Michael
Cc: Conmy, Robyn; Venkatapathy, Raghuraman; p.campo-moreno@cranfield.ac.uk; Holder, Edith
Subject: Oil Degradation Data- Dispersant project

Hi Mobing and Yu,

Could you please send your oil degradation data (normalized and non-normalized) in an excel format so that Jorge and group can continue working on their analysis.

Thanks,

Devi

Devi Sundaravadivelu, Ph.D.

Pegasus Technical Services, Inc.

On-Site Contractor to the U.S. EPA

ORD/NRMRL

26 W. Martin Luther King Dr.

Cincinnati, OH 45268

(585) 732-4101 / (513) 569-7478

To: Sundaravadivelu, Devi[sundaravadivelu.devi@epa.gov]; Zhuang, Mobing (zhuangmg)[zhuangmg@mail.uc.edu]; SantoDomingo, Jorge[Santodomingo.Jorge@epa.gov]; Elk, Michael[Elk.Michael@epa.gov]
Cc: Conmy, Robyn[Conmy.Robyn@epa.gov]; Venkatapathy, Raghuraman[Venkatapathy.Raghuraman@epa.gov]; p.campo-moreno@cranfield.ac.uk[p.campo-moreno@cranfield.ac.uk]; Holder, Edith[holder.edith@epa.gov]
From: Zhang, Yu (zhang4y5)
Sent: Mon 4/11/2016 7:38:18 PM
Subject: Re: Oil Degradation Data- Dispersant project
[Oil&DOSS Data Batch 02-Yu Zhang.xlsx](#)

Dear All,

Please find the DOSS and oil degradation results for Finasol + ANS experiment in the email. If there's any problem, please let me know.

Regards,

Yu

From: Sundaravadivelu, Devi <sundaravadivelu.devi@epa.gov>
Sent: Thursday, April 7, 2016 3:24 PM
To: Zhuang, Mobing (zhuangmg); Zhang, Yu (zhang4y5); SantoDomingo, Jorge; Elk, Michael
Cc: Conmy, Robyn; Venkatapathy, Raghuraman; p.campo-moreno@cranfield.ac.uk; Holder, Edith
Subject: Oil Degradation Data- Dispersant project

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Devi

Devi Sundaravadivelu, Ph.D.

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26 W. Martin Luther King Dr.

Cincinnati, OH 45268

(585) 732-4101 / (513) 569-7478

To: Conmy, Robyn[Conmy.Robyn@epa.gov]
From: Robinson, Brian
Sent: Fri 4/8/2016 1:55:39 PM
Subject: Followup items
[ATT00001.txt](#)
[ATT00002.htm](#)
[removed.txt](#)
[Abstract - AMOP 2016 - Brian Robinson.docx](#)

Hi Robyn,

Just a few follow-up items from our conference call. Please find my abstract for AMOP 2016 attached. I hope to have the draft presentation done by mid May.

I have also attached an email chain showing the contacts for our purchase of Finasol. I started by contacting Peter Egan with Total (peter.egan@total.com) who put me in touch with the distributor for the East Coast, which was Clear Coast llc and the contact there was Malcolm Gore (malcolm.gore@clearcoastllc.com).

Also, I forgot to mention something about our LISST data from last year. We sent our LISST into Sequoia for a routine service over the winter, and it turns out there was an issue with one of the instruments where laser power fluctuated with temperature. They are repairing it for us and said the instrument could compensate for the fluctuations, but I'm wondering if this could explain why we had some funky data in cold water. There was no way for us to know about the laser power drop-off unfortunately.

Cheers,

Brian

Flume Tank Studies to Evaluate the Fate of Crude Oil Following a Subsurface Release

Brian Robinson¹, Thomas King¹, Scott Ryan¹, Claire McIntyre¹, Patrick Toole¹, Robyn Conmy², Michel Boufadel³, Haibo Niu⁴, Kenneth Lee⁵

¹ Centre for Offshore Oil, Gas and Energy Research (COOGER), Fisheries and Oceans Canada, Dartmouth, Nova Scotia, Canada

² US Environmental Protection Agency, Office of Research and Development, Cincinnati, Ohio, USA

³ Center for Natural Resources Development and Protection, Department of Civil and Environmental Engineering, New Jersey Institute of Technology, Newark, New Jersey, USA

⁴ Department of Engineering, Dalhousie University, Halifax, Nova Scotia, Canada

⁵ Wealth from Oceans National Research Flagship, CSIRO, Australian Resources Research Centre, Kensington, WA, Australia

Following the Deepwater Horizon oil spill in 2010, the fate of crude oil resulting from a subsurface blowout has generated significant interest within the scientific community. Many questions still remain regarding the effectiveness of dispersants when used to treat oil released from deepwater blowouts, as well as the suitability of in situ fluorometric instrumentation used to monitor and track the underwater oil plumes during the Gulf of Mexico incident. In order to gain a better understanding of these critical knowledge gaps, a suite of experiments have been conducted using a meso-scale 36 m³ flume tank located at the Bedford Institute of Oceanography in Nova Scotia, Canada. The tank is equipped with a high-flow pumping system, which generates horizontal water current velocities of 5 cm/s, and coupled with a subsurface oil release system, it enables the generation of underwater oil plumes. Results from over 70 experiments have been generated, covering a wide range of petroleum products (e.g. condensate, light and medium crude oils, intermediate fuel oil, and diluted bitumen) treated with dispersant at various dispersant-to-oil ratios (e.g. 0, 1:20; 1:100; and 1:200) in both cold (<8 °C) and warm (>15 °C) water seasons. Dispersion effectiveness was monitored through in situ droplet size analysis as well as the collection of discrete water samples for chemical analysis. Evaluation of the signal response from a suite of commercially available hydrocarbon fluorometers was compared and the results will be presented. In addition, the impact of subsurface dispersant use on the surface concentrations of volatile organic compounds (VOCs) will be discussed.

Hello Brian, apologies for the delay in responding.
Thank you for your interest in Clear Coast and the Finasol product.
I do not have exact shipping costs at hand but happy to offer a price of \$32.90/Litre plus shipping costs on a pre pay and add basis.
The offer is based on a minimum order quantity of one 55g drum of product; Finasol OSR 52.
Please let me know if you need to have a formal quotation that includes shipping.
I hope that this finds you well and look forward to hearing from you.
Regards
Malcolm

From: <Robinson>, Brian <Brian.Robinson@dfo-mpo.gc.ca<mailto:Brian.Robinson@dfo-mpo.gc.ca>>
Date: Wednesday, February 4, 2015 at 11:43 AM
To: Peter Egan <peter.egan@total.com<mailto:peter.egan@total.com>>
Cc: "King, Thomas L" <Tom.King@dfo-mpo.gc.ca<mailto:Tom.King@dfo-mpo.gc.ca>>, malcolm gore <malcolm.gore@clearcoastllc.com<mailto:malcolm.gore@clearcoastllc.com>>
Subject: RE: Finasol

Dear Mr. Egan,

Thank you for the quick response! Our complete shipping address is listed below.

Attn: Brian Robinson

Bedford Institute of Oceanography

1 Challenger Drive

Dartmouth, Nova Scotia

Canada

B2Y 4A2

I look forward to hearing back from Clear Coast.

Regards,

Brian

From: Peter EGAN [mailto:peter.egan@total.com]

Sent: February 4, 2015 1:31 PM

To: Robinson, Brian

Cc: King, Thomas L; malcolm.gore@clearcoastllc.com<mailto:malcolm.gore@clearcoastllc.com>

Subject: RE: Finasol

Dear Mr. Robinson,

Thank you for your enquiry. Our distributor CLEAR COAST (copied on this mail) handles our sales of this material in North America – they will contact you directly to follow up with you. Can you please advise if Dartmouth, Nova Scotia, is the correct delivery address (they will need to know in order to prepare a quotation for you).

Thanks and regards,

Peter Egan

Special Fluids Manager

cid:image002.jpg@01CE929D.540CD150

MARKETING & SERVICES

Americas Division

Tel : +1 713 969 4651

Fax : +1 713 969 4689

Mob: +1 713 297 1996

Email: peter.egan@total.com<mailto:peter.egan@total.com>

Total Specialties USA, Inc.

1201 Louisiana St., Ste. 1800

Houston, TX 77002

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confidential.

It may not be used other than for the purpose for which it has been sent. If you are not the intended recipient,

please delete it and notify the sender immediately.

From: Robinson, Brian [mailto:Brian.Robinson@dfo-mpo.gc.ca]
Sent: Wednesday, February 04, 2015 11:28 AM
To: Peter EGAN
Cc: King, Thomas L
Subject: Finasol

Dear Mr. Egan,

I received your contact information from Timothy Steffek at BSEE. Our organization is interested in purchasing 40 L of Finasol OSR 52 for use in our wave tank facility. I was wondering if you have a Canadian distributor for this product, or if I can purchase this directly through you. If so, would you be able to send me a quote for purchasing and shipping this product to Canada?

Kind Regards,

Brian

Brian Robinson

Aquatic Science Chemist

Fisheries and Oceans Canada/Government of Canada

Bedford Institute of Oceanography

Dartmouth, Nova Scotia, Canada

Brian.Robinson@dfo-mpo.gc.ca<mailto:Brian.Robinson@dfo-mpo.gc.ca>

Tel: (902) 426-3639

Hello Brian, apologies for the delay in responding.
Thank you for your interest in Clear Coast and the Finasol product.
I do not have exact shipping costs at hand but happy to offer a price of \$32.90/Litre plus shipping costs on a pre pay and add basis.
The offer is based on a minimum order quantity of one 55g drum of product; Finasol OSR 52.
Please let me know if you need to have a formal quotation that includes shipping.
I hope that this finds you well and look forward to hearing from you.
Regards
Malcolm

From: <Robinson>, Brian <Brian.Robinson@dfo-mpo.gc.ca>
Date: Wednesday, February 4, 2015 at 11:43 AM
To: Peter Egan <peter.egan@total.com>
Cc: "King, Thomas L" <Tom.King@dfo-mpo.gc.ca>, malcolm gore <malcolm.gore@clearcoastllc.com>
Subject: RE: Finasol

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Attn: Brian Robinson
Bedford Institute of Oceanography
1 Challenger Drive
Dartmouth, Nova Scotia
Canada
B2Y 4A2

I look forward to hearing back from Clear Coast.

Regards,
Brian

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Sent: February 4, 2015 1:31 PM
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Cc: King, Thomas L; malcolm.gore@clearcoastllc.com
Subject: RE: Finasol

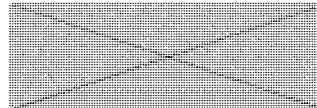
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Thanks and regards,

Peter Egan

Special Fluids Manager



MARKETING & SERVICES

Americas Division
Tel : +1 713 969 4651

Fax : +1 713 969 4689
Mob: +1 713 297 1996

Email: peter.egan@total.com

Total Specialties USA, Inc.

1201 Louisiana St., Ste. 1800
Houston, TX 77002

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Sent: Wednesday, February 04, 2015 11:28 AM
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Subject: Finasol

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Kind Regards,

Brian

Brian Robinson

Aquatic Science Chemist

Fisheries and Oceans Canada/Government of Canada

Bedford Institute of Oceanography

Dartmouth, Nova Scotia, Canada

Brian.Robinson@dfo-mpo.gc.ca

Tel: (902) 426-3639

To: Conmy, Robyn[Conmy.Robyn@epa.gov]
From: Ken Trudel
Sent: Tue 11/3/2015 4:36:30 PM
Subject: API Dispersant research Review
API Disp Research Rev Interim Report October2015.docx

Dear Robin:

As per my earlier email, I have prepared an interim report on the review of recent dispersant research papers. Could I please impose on you to have a look at it. Please have a glance at the explanatory bits early in the report and then look most closely at the sections titled "Problems" and give me your thoughts. These "problem" papers are the main focus and challenge of the project; the review of the good papers is simply a review. Please send any comments about the treatment.

We are trying to schedule a one-hour meeting for the middle of next week in New Orleans at Clean Gulf.

Regards,

Ken

--

Ken Trudel
SL Ross Environmental Research Ltd.
Tel: (613) 232-1564; Fax: (613) 232-6660
200 - 1140 Morrison Drive, Ottawa, ON
CANADA, K2H 8S9
email: ken@slross.com
web site: <http://www.slross.com>

To: Conmy, Robyn[Conmy.Robyn@epa.gov]; fingasmerv@shaw.ca[fingasmerv@shaw.ca];
tchazen@utk.edu[tchazen@utk.edu]; robert.jones@noaa.gov[robert.jones@noaa.gov];
mandyjoye@gmail.com[mandyjoye@gmail.com]; mbleigh@alaska.edu[mbleigh@alaska.edu];
karl.linden@colorado.edu[karl.linden@colorado.edu]; kmmcfarlin@alaska.edu[kmmcfarlin@alaska.edu];
msmiles@lsu.edu[msmiles@lsu.edu];
thomas.s.coolbaugh@exxonmobil.com[thomas.s.coolbaugh@exxonmobil.com];
mathijs.smit@shell.com[mathijs.smit@shell.com]; Sprenger, Mark[Sprenger.Mark@epa.gov]
Cc: nancy.kinner@unh.edu[nancy.kinner@unh.edu]
From: Mandsager, Kathy
Sent: Thur 10/29/2015 5:40:07 PM
Subject: RE: Degradation Group appendix review
20145.09.28 Appendix for Degradation Group to review.xlsx

REMINDER: Comments on these additional papers are due tomorrow. Per the results, I will be scheduling another call to discuss.

Thank you!

From: Mandsager, Kathy
Sent: Monday, September 28, 2015 5:31 PM
To: 'conmy.robbyn@epa.gov' <conmy.robbyn@epa.gov>; 'fingasmerv@shaw.ca' <fingasmerv@shaw.ca>; 'tchazen@utk.edu' <tchazen@utk.edu>; 'robert.jones@noaa.gov' <robert.jones@noaa.gov>; 'mandyjoye@gmail.com' <mandyjoye@gmail.com>; 'mbleigh@alaska.edu' <mbleigh@alaska.edu>; 'karl.linden@colorado.edu' <karl.linden@colorado.edu>; 'kmmcfarlin@alaska.edu' <kmmcfarlin@alaska.edu>; 'msmiles@lsu.edu' <msmiles@lsu.edu>; 'thomas.s.coolbaugh@exxonmobil.com' <thomas.s.coolbaugh@exxonmobil.com>; 'mathijs.smit@shell.com' <mathijs.smit@shell.com>; 'sprenger.mark@epa.gov' <sprenger.mark@epa.gov>
Cc: Kinner, Nancy <Nancy.Kinner@unh.edu>; 'Ian Gaudreau' <iangaudreau@gmail.com>; Mandsager, Kathy <kathy.mandsager@unh.edu>
Subject: Degradation Group appendix review

Degradation Group,

As follow-up to our call on Friday, a list of publications for your review are located here>><https://unh.box.com/s/wn2juyzfkgt5bd20n4s8e8bo3uq5t93>.

To make it easier for your review, we have a spreadsheet (attached) for your input. Please simply say "yes" or "no" in each of the 2 columns next to each publication. Share any comments in order to clarify or support your vote on each publication.

Please submit by **Friday 30 October.**

Kathy Mandsager

Program Coordinator

Coastal Response Research Center

Center for Spills and Environmental Hazards

234 Gregg Hall, Colovos Rd

University of New Hampshire

Durham, NH 03824

603.862.1545

Health and Safety Plan

Title: Oil Spill Research Including Work with Dispersants, Surface Washing Agents (SWAs), and Oil Degrading Microbes

Principal Investigator(s): Robyn Conmy, Edith Holder

Office: ORD

Laboratory: NRMRL

Division: LRPCD

Branch: ESMB

Building: AWBERC

Room/Lab #: 703, 701, 708, Constant Temperature Room 710, 409, 514

Approvals

I have read and approve the attached Health and Safety Plan in conformance with the ORD Facility Chemical Hygiene Plan and Health & Safety Plan Policy. I certify that the workplace hazards, routinely and non-routinely encountered by employees, during the described activities, and for which Personal Protective Equipment has been provided, have been assessed for the determination of Personal Protective Equipment required, in compliance with 29 CFR 1910 Subpart I.

	<u>Name</u>	<u>Phone</u>	<u>Signature / Date</u>
Preparer	Edith Holder	569-7178	<div>5/19/2016</div> <div>X Edith Holder</div> <div>Edith Holder</div> <div>Signed by: EDITH HOLDER (affiliate)</div>
Principal Investigator	Robyn Conmy	569-7090	<div>ROBYN CONMY</div> <div>Digitally signed by ROBYN CONMY DN: c=US, o=U.S. Government, ou=USEPA, ou=Staff, cn=ROBYN CONMY, dnQualifier=0000041674 Date: 2016.05.19 13:51:00 -04'00'</div>
Immediate Supervisor	Joseph Schubauer-Berigan	569-7734	<div>JOSEPH SCHUBAUER-BERIGAN</div> <div>Digitally signed by JOSEPH SCHUBAUER-BERIGAN DN: c=US, o=U.S. Government, ou=USEPA, ou=Staff, cn=JOSEPH SCHUBAUER-BERIGAN, dnQualifier=0000015734 Date: 2016.05.24 09:32:14 -04'00'</div>
PTSI On-Site Manager	Raghu Venkatapathy	569-7077	<div>RAGHURAMAN VENKATAPATHY (affiliate)</div> <div>Digitally signed by RAGHURAMAN VENKATAPATHY (affiliate) Date: 2016.05.19 13:09:57 -04'00'</div>
Co-PI / Contract Manager			
SHEM Approval	Steve Musson	569-7969	<div>STEPHEN MUSSON</div> <div>Digitally signed by STEPHEN MUSSON DN: c=US, o=U.S. Government, ou=USEPA, ou=Staff, cn=STEPHEN MUSSON, dnQualifier=0000036570 Date: 2016.05.25 15:44:58 -04'00'</div>

Additional information on the completion of a Health & Safety Plan may be found at the SHEM Intranet Site.

Laboratory / Field Staff Concurrence

I have read, understood and will comply with all the requirements of the attached Health and Safety Plan, SDSs, and the rules contained in the U. S. EPA- Facilities Chemical Hygiene Plan. I have also had the opportunity to ask any questions, and had my questions satisfactorily answered prior to my beginning work under this plan.

Name (Print)	Employer (EPA, ORISE, Contractor name, etc.)	Lab (L), Field (F), or Both?	Signature	Date
Edith Holder	Contractor	L	See cover page	

Project Description

Unintentional releases of oil into coastal waters may result in oil becoming stranded on shorelines. Oil that reaches the shoreline can have a severe effect on the local environment, including toxic exposures and smothering of biota in direct contact with the oil. Surface washing agents (SWAs) are chemical agents intended to enhance the removal of oil from shoreline surfaces, thereby minimizing detrimental effects to impacted biota. Dispersants are chemical agents intended to break up the oil by reducing the oil-water interfacial surface tension, which will eventually promote dispersion of oil droplets into the water column. It is necessary to evaluate the potential benefits as a remediation aide of these two classes of compounds as well as the long term ramifications to the environment of their use.

Indigenous bacteria have the capability of removing oil components by biodegradation. The capability of populations from different sources to biodegrade different oils as well as the interactions of microbial populations to the various dispersants and SWAs is a subject for current study.

Laboratory Activities

This laboratory has done previous studies looking at the effects of dispersants, SWA, bioremediation products, and microbes enriched from sediments and water. From an earlier QAAP 386-Q11-0, endorsed 7 June 2002: "The U.S. Environmental Protection Agency's (EPA) Oil Spill Research Program encompasses several major objectives: 1) to develop and/or conduct scientifically sound and defensible protocols for testing the effectiveness of commercial bioremediation products on crude and refined oil in various environments, 2) to develop and/or conduct chemical and microbiological methods for characterizing changes in the chemical and biological composition of oil-contaminated matrices, such as beach material, soil, or water; and 3) to conduct research defining the proper conditions needed to bring about oil spill cleanup in the field. Research to address these objectives was initiated under Quality Assurance Project Plan (QAPP)ID No. C-781-B. The work performed earlier used Alaskan oil and Alaskan cultures. The current research will include Gulf of Mexico oil and cultures, as well as other oils of interest such as Dilbit and freshwater cultures from the Enbridge spill in Kalamazoo, MI. If new spills occur, oil and sediments from the impacted site may come under investigation.

Analysis of oil in water will be measured by Fluorometry. Samples of oil that have been extracted into either methylene chloride or hexane will be measured using UV/Vis Spectrophotometry or GC/MS. The current work will use the methods listed in the following QAPPs and HASPS which can be found on the L drive under L:Public\NRMRL-PUB\Holder\OilSpill\HASP&QAPP:

\QAPP_SWA_2014\WA 0-05 L10539-QP-1-6.pdf Validation and Testing of a Surface Washing Agent Testing Protocol containing Standard Operating Procedure for Testing effectiveness of Surface Washing Agents Listed on the National Contingency Plan Product Schedule, February 2016

\QAPP_BFT_2013\WA 05 QAPP for Development and Revision of Procedures for the CFR_20141024.pdf November 2015

\L14866-QP-1-6 Appendix A final 19Sep2013.docx

Oil Dispersant Testing, Standard Operating Procedure for Determining Effectiveness of Oil Dispersants Using the Baffled Flask Test, May 2013

L14866-QP-1-6 Appendix B final 19Sep2013.docx

Bioremediation Product Testing, Standard Operating Procedure for the Bioremediation Agent Effectiveness Test Protocol, May 2013

\L14866-QP-1-6 Appendix C final 19Sep2013 Oil Analysis SOPs, GC/MS procedures, May 2013

SOP 1: Glassware Cleaning Procedure for Oil Spill Projects

SOP 2: Preparation of Surrogate Recovery Standards

SOP 3: Preparation of Internal Standard Solution

SOP 4: Preparation of Working Standards, Check Standards, and Oil Standards for GC/MS Consistency.

SOP 5: GC/MS Method for the Analysis of Crude Oil Samples

\QAPP_Tox_2015\L21545-QP-1-0 QAPP Crude Oil Toxicity.docx July 2015

Addendum17Nov_L21545-QP-1-0

A QAPP for specific research utilizing fluorescence spectrometry, GC/FID, particle size distribution is in development.

\FDOM analysis.doc Standard Operating Protocol for Fluorescent Dissolved Organic Matter (FDOM)

A majority of the analytical methods are common to multiple projects and activities conducted within the oil spill program. The analytical work covered under this HASP includes experiments with oil dispersants, surface washing agents (SWA), and oil degrading bacteria enriched from natural sources. Abiotic testing of the dispersants and SWA testing will utilize different oils and different products, varying parameters of application, temperature, weathering effects, and substrate. Biotic experiments will include biodegradation studies using a sacrificial shake flask experimental design.

The instruments that will be used for measuring oil components are a Shimadzu UV 1800 Spectrophotometer, Horiba Fluorolog3 Spectrofluorometer, WetLabs, Inc. ECO Submersible Fluorometer, Sequoia Scientific LISST 100X, Agilent 7890B Gas Chromatograph / Flame Ionization Detector, and Agilent 6890 Gas Chromatograph with a 5973 Mass Spectrometer Detector. For all experiments, solvent (water, dichloromethane (DCM) or hexane) extracts of oil will be produced for analytical measurement.

Room 703 is the base lab for the various activities. The GC/MS is located in room 409, and the GC/FID is in room 514. CTR 710 will be used for 5 °C work and 708 for work at 25 °C. Storage of oil is in 703, storage of frozen samples is in 701, and storage of refrigerated samples is in 701 and CTR 710.

The full notice regarding dichloromethane (DCM) is given at the end of this document.

Physical Hazards Summary

The physical hazards marked below have been identified as present during the performance of the project. Job hazards for specific steps are described in the Job Hazard Analysis Table at the end of the HASP. Check the Lab column for lab hazards and Field column for hazards applicable to field work.

Physical Hazards	Lab	Field
Electrical Hazards	X	
Radioactive Materials – requires RSO approval of HASP		
Non-Ionizing Radiation		
Ionizing Radiation – requires RSO approval of HASP		
Heavy Lifting		
Vibration		
UV light/radiation	X	
Noise		
Temperature	X	
Illumination		
Compressed Gas	X	
Sharp Objects / Tools		
Slips, Trips, Falls		
Other (Specify): rotating equipment – laboratory shaker	X	

PPE Summary

*The PPE items marked below are required to be utilized during performance of the project. PPE requirements for specific steps are described in the Job Hazard Analysis Table at the end of the HASP. Check the Lab column for lab hazards and Field column for hazards applicable to field work. *Minimum dress for entering a laboratory is closed toed shoes, long pants (waist to ankles), shirt, and safety glasses. Additional PPE shall be required based upon activities.*

PPE Type	Lab*	Field
Face / Eye Protection		
Safety Glasses w/ Side Shields	X	
Chemical Splash Goggles	X	
Face Shield	X	
Other (specify)		
Ear Protection		
Ear Plugs (Foam Inserts)		
Ear Muffs		
Both Ear Plugs and Ear Muffs		
Other (specify)		
Hand Protection		
Nitrile disposable exam	X	
Latex disposable exam		
Butyl disposable exam		
Silver Shield® or Ansell Barrier Gloves	X	
Thermal (Heat Resistant) Gloves	X	
Cryogen Gloves		
Cotton Gloves		
Leather Gloves		
Cut Resistant (Kevlar ®)		
Other (specify): Polypropylene Gloves (see FDOM SOP); PVA (better tactile than Silver Shield. Used when splash is not expected)	X	

PPE Type	Lab*	Field
Protective Clothing		
Lab Coat	X	
Lab Apron		
Jumpsuit/Coveralls		
Traffic Safety Vests		
Shoe covers		
Safety Shoes: Steel Toe Boots and Shoes		
Safety Shoes: Metatarsal Boots		
Safety Shoes: Slip Resistant Boots and Shoes		
Oversleeves		
Other (specify)		

Respiratory Protection

Employees Wearing Respiratory Protection must be enrolled in the Respiratory Protection Program, must be medically cleared to wear a respirator, and have annual training before wearing a respirator. The respirators marked below (X) are required to be utilized during performance of the project. Respirator requirements for specific project steps are described in the Job Hazard Analysis Table at the end of the HASP.

No respirators/dust masks are required for this project. Respirator/dust mask use is not authorized. Contact the SHEM Office for requirements if respirator/dust mask use becomes necessary.	X
N-95 Filtering Facepiece/Dust Mask	
P-100 Filtering Facepiece/Dust Mask	
Air Purifying Half Face Respirator	
Air Purifying Full Face Respirator	
Airline Supplied Air Respirator	
SCBA	
Powered Air Purifying Respirator (PAPR)	

The following cartridges shall be used: N/A

The cartridges shall be changed/removed from service on the following schedule: N/A

Equipment Requirements

The safety equipment/engineering controls marked below(X) are required to be utilized during performance of the project. Requirements for specific steps are described in the Job Hazard Analysis Table at the end of the HASP.

Chemical Fume Hood	X
Biological Safety Cabinet	
Walk-in / Bulking Hood	
Radiological Fume Hood	
Balance Enclosure	
Clear Air Bench (laminar flow hood)	
Spot Ventilation Unit (Snorkel)	
Local Exhaust Ventilation	

Canopy Hood	
Refrigerator / Freezer	X
Deep Freezer	X
Other (specify): spectrophotometer / shaker / GC/MS/ drying oven and muffle furnace	X

Chemicals To Be Used

EPA utilizes an online service, Chemwatch, to provide Safety Data Sheets (SDS) to employees.

<http://jr.chemwatch.net/chemwatch.web>

Account: epa User Name: Everyone Password: 120270.

If the SDS is not available through Chemwatch, a hardcopy of the manufacturer supplied SDS must be submitted to the SHEM office for upload to the Chemwatch system. **ALL fields must be completed in the table below for all chemicals used in the project.**

Item #	Chemical Name	CAS#	Project Use	Disposal Method for Unused Chemicals	Notes
			Ex. Reagent, Standard, or Specific task #	S = Sink T = Trash W = Chemical Waste Program R = Return to Vendor	(EPA waste codes, special hazards, ingredients, etc.)
1	Dichloromethane	75-09-2	Solvent	W	U080, F002; See special OSHA information at end of HASP. Carcinogen
2	Hexane	110-54-3	Solvent	W	
3	Petroleum Crude Oil, listed below	8002-05-9	Reagent	W	
4	Various products from NCPSS, listed below	Mixtures	Dispersants and SWA	W	
5	Sodium Sulfate	7757-82-6	Reagent	W	
6	Sea Salts (Sigma) (or Instant Ocean)	Mixture	Media	S or T	
7	Bushnell-Haas Broth	Mixture	Media	S or T	Contains: MgSO ₄ , CaCl ₂ , KH ₂ PO ₄ , K ₂ HPO ₄ , NH ₄ NO ₃
8	Sodium Chloride	7647-14-5	Media	S	
9	Potassium Chloride	7447-40-7	Media	S	
10	Potassium Bromide	7758-02-3	Media	W	
11	Sodium Borate	1303-96-4	Media	S	
12	Magnesium Chloride	7791-18-6	Media	S or T	
13	Calcium Chloride	10043-52-4	Media	S or T	
14	Strontium Chloride	10476-85-4	Media	W	
15	Sodium Bicarbonate	7757-82-6	Media	S or T	
16	Potassium Nitrate	7757-79-1	Media	W	D001 - oxidizer
17	Iron Chloride	10025-77-1	Media	W	
18	Sodium Tripolyphosphate	7722-88-5	Media	W	
19	Sodium Hydroxide	1310-73-2	reagent	W	D002

Item #	Chemical Name	CAS#	Project Use	Disposal Method for Unused Chemicals	Notes
			Ex. Reagent, Standard, or Specific task #	S = Sink T = Trash W = Chemical Waste Program R = Return to Vendor	(EPA waste codes, special hazards, ingredients, etc.)
20	Hydrochloric Acid	7647-01-0	Reagent, acid washing, fluorometry	W	
21	Acenaphthene	83-32-9	standard	W	
22	Acenaphthylene	208-96-8	standard	W	
23	Benzo(a)anthracene	56-55-3	standard	W	
24	Biphenyl	92-52-4	standard	W	
25	2,6-Dimethylnaphthalene	581-42-0	standard	W	
26	3,6-Dimethylphenanthrene	1576-67-6	standard	W	
27	1-Methylnaphthalene	90-12-0	standard	W	
28	2-Methylphenanthrene	2531-84-2	standard	W	
29	2,3,5-Trimethylnaphthalene	2245-38-7	standard	W	
30	Decane	124-18-5	standard	W	
31	Undecane	1120-21-4	standard	W	
32	Dodecane	112-40-3	standard	W	
33	Tridecane	629-50-5	standard	W	
34	Tetradecane	629-59-4	standard	W	
35	Pentadecane	629-62-9	standard	W	
36	Hexadecane	544-76-3	standard	W	
37	Heptadecane	629-78-7	standard	W	
38	Octadecane	593-45-3	standard	W	
39	Nonadecane	629-92-5	standard	W	
40	Eicosane	112-95-8	standard	W	
41	Heneicosane	629-94-7	standard	W	
42	Docosane	629-97-0	standard	W	
43	Tricosane	638-67-5	standard	W	
44	Tetracosane	646-31-1	standard	W	
45	Pentacosane	629-99-2	standard	W	
46	Hexacosane	630-01-3	standard	W	
47	n-Heptacosane	593-49-7	standard	W	
48	Octacosane	630-02-4	standard	W	
49	n-Nonacosane	630-03-5	standard	W	
50	n-Triacontane	638-68-6	standard	W	
51	n-Hentriacontane	630-04-6	standard	W	
52	n-Dotriacontane	544-85-4	standard	W	
53	n-Tritriacontane	630-05-7	standard	W	
54	n-Tetratriacontane	14167-59-0	standard	W	
55	n-Pentatriacontane	630-07-9	standard	W	
56	Naphthalene	91-20-3	standard	W	
57	Fluorene	86-73-7	standard	W	
58	Dibenzothiophene	132-65-0	standard	W	

Item #	Chemical Name	CAS#	Project Use	Disposal Method for Unused Chemicals	Notes
			Ex. Reagent, Standard, or Specific task #	S = Sink T = Trash W = Chemical Waste Program R = Return to Vendor	(EPA waste codes, special hazards, ingredients, etc.)
59	Phenanthrene	85-01-8	standard	W	
60	Fluoranthene	206-44-0	standard	W	
61	Pyrene	129-00-0	standard	W	
62	Chrysene	218-01-9	standard	W	
63	Benzo(b)fluoranthene	205-99-2	standard	W	
64	Benzo(k)fluoranthene	207-08-9	standard	W	
65	Benzo(e)pyrene	192-97-2	standard	W	
66	Benzo(a)pyrene	50-32-8	standard	W	
67	Perylene	198-55-0	standard	W	
68	Indeno(1,2,3-cd)pyrene	193-39-5	standard	W	
69	Dibenzo(a,h)anthracene	53-70-3	standard	W	
70	Benzo(g,h,i)perylene	191-24-2	standard	W	
71	Pristane	1921-70-6	standard	W	
72	Phytane	638-36-8	standard	W	
73	Anthracene	120-12-7	standard	W	
74	Benzo[b]naphtho[2,1[d]thiophene	239-35-0	standard	W	
75	5b-Cholestane	481-20-9	standard	W	
76	5a-Androstane	438-22-2	standard	W	
77	Hopane	1176-44-9	standard	W	
78	D22 n-Decane	16416-29-8	standard	W	
79	D34 n-Hexadecane	15716-08-2	standard	W	
80	D42 n-Eicosane	62369-67-9	standard	W	
81	D62 n-Triacontane	93952-07-9	standard	W	
82	D8-Naphthalene	1146-65-2	standard	W	
83	D10-Anthracene	1719-06-8	standard	W	
84	D12-Chrysene	1719-03-5	standard	W	
85	D12-Perylene	1520-96-3	standard	W	
86	D36-Heptadecane	39756-35-9	standard	W	
87	D50-Tetracosane	16416-32-3	standard	W	
88	D66-Dotriacontane	62369-68-0	standard	W	
89	D10-1-methylnaphthalene	1517-22-2	standard	W	
90	D10-Phenanthrene	1517-22-2	standard	W	
91	D10-Pyrene	1718-52-1	standard	W	
92	Ph buffers 4, 7, and 10	Varies	Calibration	S	
93	Nitric Acid	7697-37-2	pH adjustment/ sand washing	W	D001, D002
94	Methanol	67-56-1	fluorometry	W	U154, D001, F003
95	Rhodamine B	81-88-9	fluorometry	W	
96	Ethylene Glycol	107-21-1	fluorometry	W	
97	Quinine Sulfate Dihydrate	6119-70-6	fluorometry	W	

Item #	Chemical Name	CAS#	Project Use	Disposal Method for Unused Chemicals	Notes
			Ex. Reagent, Standard, or Specific task #	S = Sink T = Trash W = Chemical Waste Program R = Return to Vendor	(EPA waste codes, special hazards, ingredients, etc.)
98	Sulfuric Acid	7664-93-9	Fluorometry, pH adjustment	W	D002
99	Dimethyldichlorosilane (5%) in Toluene	Mixture	Silanizing glassware	W	
100	Sodium Azide	26628-22-8	Microbial Growth Inhibitor	W	P105
101	Magnesium Sulfate	7487-88-9	Media	S or T	
102	Manganese Sulfate	10034-96-5	Media	S or T	
103	Boric Acid	10043-35-3	Media	S or T	
104	Zinc Sulfate	7446-20-0	Media	S or T	
105	Ammonium Molybdate	12054-85-2	Media	S or T	
106	Potassium Hydrogen Phosphate	7758-11-4	Media	S or T	
107	Potassium dihydrogen Phosphate	7778-77-0	Media	S or T	

Current Inventory of Crude Oils Line Item # 3 (May 2016)

Anadarko	Dilbit, WCS	Harmony	PXP 02
ANS	Doba	IFO 120	Rock
ANS 521	Elly	IFO 380	South Louisiana
Arabian Light	Endicott	North Star	Sweet Synthetic
BHP Billiton	Endicott (18% evaporated)	PER 038	Terra Nova
Bonnie Light	Esgravos	PER 040	Venoco E-10
Bunker C	FO2	Prudhoe Bay	Venoco E-19
Dilbit, Cold Lake	Fuel 6	PXP 01	Dorado

Current Inventory of NCPPS Oil Spill Dispersants Line Item # 4 (May 2016)

Accell Clean DWD	FFT Solution	NEOS AB3000	Saf-Ron Gold
Corexit 9500	Finasol OSR52	Nokomis 3-AA	SX-100
Dispersit SPC1000	JD-2000	Nokomis 3-F4	ZI-400

Current Inventory of NCPPS Oil Spill Surface

ADP7	Enviroclean	Naturama G3 A-5	Sandklene 950
Aquaclean	EPA Oil Field Solution™	Nokomis 5W	SC-1000
BG-Clean 401	F500	Nontox SWA	Simple Green
Biosolve	Gold Crew SW	Petro-Clean	Spillclean
CleanGreen Planet Wash	Green Beast	Petroluxus	Superall #38
Corexit 9580	Jep Marine Clean	Petrotech 25	
Cytosol	Marine Green Clean	Premier 99	
Dynamic Green	Marine Green Clean Plus	Procleans PCR 107	

Biological Research (indicate Yes or No)

Does the project in any way involve manipulation of recombinant DNA?	No
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If yes, are all proposed activities specifically exempted from the NIH Guidelines for Research Involving Recombinant DNA Molecules?	
Does the project in any way involve human subjects or biological materials obtained from human subjects?	No
If yes, is the project exempt from the Health and Human Services Policy for Protection of Human Subjects?	
Does the project involve animals requiring Institutional Animal Care & Use Committee (IACUC) approval? (includes vertebrate & invertebrates animals)	No

Biological Agents

The Biosafety Level (BSL) and Animal Biosafety Level (ABSL) refer to specific combinations of work practices, safety equipment, and facility design elements utilized to minimize exposure of workers and the environment to infectious agents. Principal Investigators must perform an agent risk assessment to determine the BSL. Indicate N/A if not applicable to project.

Item #	Biological Agent (list all that apply)	BSL #	Source of Biological Agent	Vaccination Required?
1	Oil degrading bacteria isolated from environmental samples	1	Water or sediments	no

Waste Management

Identify process/research derived samples and wastes and indicate the intended disposal method. Hazardous Waste identification and Treatability study exemptions per 40 CFR Part 261 as reviewed in annual SHEM Hazardous Waste Management training.

	Yes	No
Will Hazardous Waste Be Generated?	X	
Will the Treatability Exemption be Utilized (i.e. will materials from an outside location that would be considered hazardous waste		X

DCM, hexane, methanol, and crude oil wastes (dissolved in DCM) from analytical samples collected via separatory funnel, standards, and glassware rinsate should be disposed of through the SHEM hazardous wastes program due to solvent, oil and PAH contents. After washing gravel and sand with DCM, the DCM is drained into the waste container and the substrate is placed in the fume hood to allow the remaining DCM to evaporate off, before disposing of the cleaned substrate in the garbage.

Spent silanizing solution should be disposed through the SHEM hazardous waste program.

Original chemical reagents will be disposed as indicated in the chemical use table.

Any remaining fresh or seawater will be disposed of down the sink drain because no known hazardous wastes are involved.

Aqueous waste remaining after removal of DCM using a separatory funnel may be sink disposed. Any remaining DCM is placed in a hazardous waste container before dumping remaining water to sink.

Acid solution from sand/gravel cleaning will be collected and neutralized using sodium hydroxide to a pH between 5 and 9 and then disposed of down the sink.

Sample Management

Explain how samples will be identified and labeled for storage (if not immediately discarded) and eventual disposal. Sample contents must be clearly displayed. Include storage location and how long samples must be retained.

All samples will be labeled with sample descriptors including date, analyst, and constituents (solutes and solvents). They will be stored in the refrigerators in 701 or CTR710. They will be kept until data is approved and then disposed of using the Chemical Waste Program. Any enriched bacterial consortia will be frozen and kept in the -80 freezer in 701. They may be maintained indefinitely.

Hexane containing samples are flammable and should only be stored in refrigerators or freezers designed and labeled as approved for flammable material storage.

Spill Response

Describe procedures for managing spills of specific hazardous chemicals, both small and large. General spills may be addressed by reference to the Chemical Hygiene Plan.

Small spills shall be wiped up by project personnel wearing proper PPE and the absorbent material bagged, labeled as to its hazardous constituents, then submitted to the SHEM Waste Program for proper disposal. In the event of a large solvent spill, SHEM will be contacted via x7997 or by way of security per the Chemical Hygiene Plan.

The spill of any bacterial consortia that have been enriched from environmental samples will be doused with either a 10% chlorine solution or 70% ethanol solution, allowed to sit for ~ 10 minutes and then wiped up. The wipes used will be placed in a biohazard bag for autoclaving.

The SHEM program office provides spill kits for all laboratory use. Staff should review the list and determine the location of the nearest spill kit. (Delete those areas not applicable)

AWBERC	G through 7 floors in the freight elevator lobby
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In addition, the lab maintains spill kits in the following location: 703- on the left side of the lab near the door.

The biological spill kit is located: N/A

Authorized Personnel

Training and medical monitoring requirements will vary depending on the complexity and materials used in the process. Therefore, only personnel trained and monitored will be permitted to work under this plan. To be “authorized”, employees must have completed the training and screenings selected below.

Mandatory for all researchers	
Initial Laboratory Safety	X
Current Chemical Hygiene Plan Laboratory Safety Refresher	X
Hazardous Waste Management (RCRA)	X
Project/Task Dependent	
Medical Surveillance	X
Respiratory Protection	
Biosafety / Blood borne Pathogens	
Initial Field Safety and/or 8 hour field safety refresher training in the fiscal year	
40 - hour HAZWOPER and/or 8 hour HAZWOPER refresher in the last 12 months	
Hearing Protection	
First Aid / CPR / AED	
DOT Hazardous Materials Awareness/Shipment	
Radiation Safety	
EPA Driver's Training	
EPA Boat Safety Training	
EPA Nanomaterials Health and Safety Awareness Training	
Other (specify) – Dichloromethane information (See below)	X

References:

General Activities
Job Hazard Analysis, Controls, and PPE

Job Step/Operation	Room / Area	Potential Hazards/Risks	Recommended Action/Procedure	PPE Required
Preparation of artificial seawater and freshwaters	703	Little chemical hazard as it consists of salts. Irritants	Prepare chemical solutions in a CFH where possible	Lab coat, safety glasses with side shields, nitrile gloves, closed-toe shoes
Use of freezer	701	Thermal burns from the ultra low freezer	Use caution when handling items from the freezer	Thermal protective gloves Lab coat, safety glasses with side shields, nitrile gloves, closed-toe shoes
Use of autoclave	380	See chemical hygiene plan for Autoclave Hazard Analysis	See chemical hygiene plan for Autoclave Hazard Analysis	See chemical hygiene plan for Autoclave Hazard Analysis
Use of centrifuge		See chemical hygiene plan for Centrifuge Hazard Analysis	See chemical hygiene plan for Centrifuge Hazard Analysis	See chemical hygiene plan for Centrifuge Hazard Analysis
Preparation of dilute acid from concentrated acid for performing pH adjustments	703	Splash – chemical burns to exposed skin	Prepare solution in a chemical fume hood	Face shield – Lab coat, safety glasses with side shields, nitrile gloves, closed-toe shoes
Use of drying oven and muffle furnace	703	Burns	Caution with hot glassware. Let muffle furnace completely cool down before removing glassware.	Thermal protective gloves
CTR 710		Limited ventilation – build up of chemical vapors, inhalation of DCM and other toxic and carcinogenic chemical vapors	No open chemical container work should be performed in CTR 710. All containers should remain closed. Samples should be moved to a room with a CFH if necessary to open.	Lab coat, safety glasses with side shields, nitrile gloves, closed-toe shoes

SOP 1 - Glassware Washing
Job Hazard Analysis, Controls, and PPE

Glassware Washing * includes supplies, utensils and containers in contact with soil, extraction fluid, and/or leachate			
Sequence of Basic Job Steps	Potential Hazards	Recommended Action or Procedure	PPE Required
Rinse loose debris from the surface	<ul style="list-style-type: none"> Cross contamination from glassware to personnel – potential exposure Splash or spray from rinsing – potential exposure Potential breakage of glassware from cracks or defects – cuts / lacerations / contamination 	<ul style="list-style-type: none"> Inspect glassware before cleaning for cracks or other damage – discard in broken glass container if damage is noticed or suspected use low pressure water to avoid splash and/or aerosolization of the contaminants if any glassware is broken during cleaning – only remote means should be used to pick up any broken glass 	<ul style="list-style-type: none"> minimum of safety glasses, laboratory coat, and gauntlet length nitrile gloves
Wash with brush, soap, and water. Triple rinse with water. Soak in soap bath.	<ul style="list-style-type: none"> Cross contamination from glassware to personnel – potential exposure Splash or spray from rinsing – potential exposure Potential breakage of glassware from cracks or defects – cuts / lacerations / contamination 	<ul style="list-style-type: none"> Inspect glassware before cleaning for cracks or other damage – discard in broken glass container if damage is noticed or suspected use low pressure water to avoid splash and/or aerosolization of the contaminants if any glassware is broken during cleaning – only remote means should be used to pick up any broken glass 	<ul style="list-style-type: none"> minimum of safety glasses, laboratory coat, and gauntlet length nitrile gloves
Drying object using drying racks	<ul style="list-style-type: none"> potential for dropping the glassware, tools, etc. – breakage, spillage, contact with other surfaces slip / trip / fall hazards from water spillage or splashing from the rinsing process 	<ul style="list-style-type: none"> ensure that the drying racks are placed to reduce any ergonomic hazard from stretching, or repetitive motion follow the established emergency procedures for injuries or spills including immediate notification of your supervisor or 911 for life threatening cases (also x7777, direct contact to security) 	<ul style="list-style-type: none"> minimum of safety glasses, laboratory coat, and gauntlet length nitrile gloves

SOP 2 -Preparation of a Surrogate Recovery Standard

SOP 3 - Preparation of Internal Standard Solution

SOP 4 - Preparation of Working Standards, Check Standards, and Oil Standards for GC/MS

Job Hazard Analysis, Controls, and PPE

Job Step/Operation	Potential Hazards/Risks	Recommended Action/Procedure	PPE Required
Weigh reagents Dissolve reagents / wash beakers using methylene chloride Transfer the solution	Reagents listed contain materials that are listed as carcinogens or potential for causing cancer, irritants, and are photosensitizers. Potential for illness upon inhalation and / or skin contact (chemical dermatitis, increase probability for sunburn)	Prepare the reagents / standards in a chemical fume hood only. Handle reagents in the smallest quantities possible and do not cross contaminate. DCM – attempt to not ‘pour’ DCM as the ST is low and tends to spread. Use the sash on a CFH for splash protection where possible. Review OSHA Regulated Substance Awareness for DCM.	Double gloves - Wear normal length nitrile gloves over silvershield gloves to maintain dexterity; Lab coat, safety glasses with side shields, and closed-toe shoes.

HASP #: 2014-033 Rev 2

Expiration Date: 06/30/2017

Pipetting	see chemical hygiene plan for pipetting recommendations	See chemical hygiene plan for pipetting recommendations	Double nitrile gloves and / or silvershield gloves (where dexterity is not an issue). Lab coat, safety glasses with side shields, and closed-toe shoes.
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**SOP 5 - GC/MS Method for the Analysis of Crude Oil
Job Hazard Analysis, Controls, and PPE**

Job Step/Operation	Potential Hazards/Risks	Recommended Action/Procedure	PPE Required
Compressed Gas Usage (Helium)	See Chemical Hygiene Plan – JHA for Compressed Gas Cylinders	See Chemical Hygiene Plan – JHA for Compressed Gas Cylinders	See Chemical Hygiene Plan – JHA for Compressed Gas Cylinders
Solvent / standard / stock preparation	See JHA for SOP 2, 3, and 4)	See JHA for SOP 2, 3, and 4)	See JHA for SOP 2, 3, and 4)
GC Operation	Compressed Gases GC venting of toxic analytes	Ensure GC exhaust is routed to laboratory ventilation.	Lab coat, safety glasses, protective gloves

**SOPs - Analysis of Oil Concentration in DCM by UV/Vis Spectrophotometry and Spectrofluorometry
Job Hazard Analysis, Controls, and PPE**

Job Step/Operation	Potential Hazards/Risks	Recommended Action/Procedure	PPE Required
Add DCM to crude oil Syringe use Extraction with DCM (shaking and venting) Dispense / transfer solutions	Reagents listed contain materials that are listed as carcinogens or potential for causing cancer, irritants, and are photosensitizers. Potential for illness upon inhalation and / or skin contact (chemical dermatitis, increase probability for sunburn)	Prepare the reagents / standards in a chemical fume hood only. Handle reagents in the smallest quantities possible and do not cross contaminate. DCM – attempt to not ‘pour’ DCM as the ST is low and tends to spread. Use the sash on a CFH for splash protection where possible. Review OSHA Regulated Substance Awareness for DCM.	Double gloves - Wear normal length nitrile gloves over silvershield gloves to maintain dexterity; Lab coat, safety glasses with side shields, and closed-toe shoes.
Pipetting	See chemical hygiene plan for pipetting recommendations	See chemical hygiene plan for pipetting recommendations	Double nitrile gloves and / or silvershield gloves (where dexterity is not an issue). Lab coat, safety glasses with side shields, and closed-toe shoes.
Operation of Spectrophotometer and Fluorometer	UV light exposure	Check for presence of all equipment guards and verify operation.	Nitrile gloves Lab coat, safety glasses with side shields, and closed-toe shoes.

**SOP - The Baffled Flask Test for Determining Effectiveness of Dispersants
Extraction of WAFs from Toxicity Testing QAPP
Job Hazard Analysis, Controls, and PPE**

Job Step/Operation	Potential Hazards/Risks	Recommended Action/Procedure	PPE Required
Add DCM to crude oil and seawater Syringe use Extraction with DCM (shaking and venting) Dispense / transfer solutions	Reagents listed contain materials that are listed as carcinogens or potential for causing cancer, irritants, and are photosensitizers. Potential for illness upon inhalation and / or skin contact (chemical dermatitis, increase probability for sunburn)	Prepare the reagents / standards in a chemical fume hood only. Handle reagents in the smallest quantities possible and do not cross contaminate. DCM – attempt to not ‘pour’ DCM as the ST is low and tends to spread. Use the sash on a CFH for splash protection where possible. Review OSHA Regulated Substance Awareness for DCM.	Double gloves - Wear normal length nitrile gloves over silvershield gloves to maintain dexterity; Lab coat, safety glasses with side shields, and closed-toe shoes.
Pipetting	See chemical hygiene plan for pipetting recommendations	See chemical hygiene plan for pipetting recommendations	Double nitrile gloves and / or silvershield gloves (where dexterity is not an issue). Lab coat, safety glasses with side shields, and closed-toe shoes.
Extraction with DCM including shaking and venting	Reagents listed contain materials that are listed as carcinogens or potential for causing cancer, irritants, and are photosensitizers. Potential for illness upon inhalation and / or skin contact (chemical dermatitis, increase probability for sunburn)	Perform extraction in a chemical fume hood only. Handle reagents in the smallest quantities possible and do not cross contaminate. Use the sash on a CFH for splash protection where possible. This should ONLY be done in a CFH.	Double gloves - Wear normal length nitrile gloves over silvershield gloves to maintain dexterity; Lab coat, safety glasses with side shields, and closed-toe shoes.
Operation of Spectrophotometer or Spectrofluorometer	UV light exposure	Ensure all equipment guards are present and operable.	Nitrile gloves Lab coat, safety glasses with side shields, and closed-toe shoes.
Use of the shaker	Spills, mechanical issues with equipment	Ensure all equipment guards are present and operable. Ensure a periodic inspection of equipment.	Nitrile gloves Lab coat, safety glasses with side shields, and closed-toe shoes.

**SOP - Basket Test for Determining Effectiveness of SWA
Job Hazard Analysis, Controls, and PPE**

Job Step/Operation	Potential Hazards/Risks	Recommended Action/Procedure	PPE Required
Acid wash of the substrate	burns from acid contact from spills, splashes from bath	Conduct in chemical fume hood	Double nitrile gloves - Wear normal length nitrile gloves inside of elbow length nitrile gloves; Wear a face shield / chemical splash goggles.
Addition of crude oil	Reagents listed contain materials that are listed as carcinogens or potential for causing cancer, irritants, and are photosensitizers. Potential for illness upon inhalation and / or skin contact (chemical dermatitis,	Prepare the reagents / standards in a chemical fume hood only. Handle reagents in the smallest quantities possible and do not cross contaminate. Use the sash on a CFH for splash protection where possible. – see chemical hygiene plan for pipetting recommendations.	Double gloves - Wear normal length nitrile gloves over silvershield gloves to maintain dexterity; Lab coat, safety

HASP #: 2014-033 Rev 2

Expiration Date: 06/30/2017

	increase probability for sunburn) – see chemical hygiene plan for pipetting recommendations	Review OSHA Regulated Substance Awareness information below for DCM.	glasses with side shields, and closed-toe shoes.
Use of the shaker	skin chemical contact from splash or spill - eye chemical contact inhalation of chemicals contact injury with moving/rotating machinery	Work in a chemical fume hood when preparing reagents. Ensure all caps are tightly sealed. Ensure area is clear before starting shaker. Secure loose fitting clothing to prevent snagging by shaker.	Laboratory coat, and nitrile gloves; wear chemical splash goggles
DCM extraction	Reagents listed contain materials that are listed as carcinogens or potential for causing cancer, irritants, and are photosensitizers. Potential for illness upon inhalation and / or skin contact (chemical dermatitis, increase probability for sunburn)	Perform extraction in a chemical fume hood only. Handle reagents in the smallest quantities possible and do not to not cross contaminate. Use the sash on a CFH for splash protection where possible. This should ONLY be done in a CFH.	Double gloves - Wear normal length nitrile gloves over silvershield gloves to maintain dexterity; Lab coat, safety glasses with side shields, and closed-toe shoes.
UV spectrophotometry	eye chemical contact inhalation of chemicals skin chemical contact from splash or spill	Work in a chemical fume hood when handling reagents with respiratory warnings Handle quartz cuvet with secure grip to prevent dropping or breaking	wear a laboratory coat, and nitrile gloves; wear chemical splash goggles

Methylene Chloride / Dichloromethane

Per OSHA regulation 29 CFR 1910.1052, an employer shall provide information and training for each affected employee prior to or at the time of initial assignment to a job involving potential exposure to methylene chloride. Through the use of laboratory fume hoods and procedures outlined in the laboratory chemical hygiene plan and the project health and safety plan, exposure above the regulatory action level is not expected. A full copy of the regulation is available on the OSHA website at www.OSHA.gov or through the SHEM Office. Other information on the safe use of methylene chloride is also available from the SHEM office and OSHA website.

DICHLOROMETHANE		ICSC: 0058
Methylene chloride DCM CH_2Cl_2 Molecular mass: 84.9 ICSC # 0058		CAS # 75-09-2 RTECS # PA8050000 UN # 1593 EC # 602-004-00-3 December 04, 2000 Validated

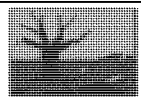


TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible under specific conditions. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION	Risk of fire and explosion (see Chemical Dangers).	Prevent build-up of electrostatic charges (e.g., by grounding).	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		PREVENT GENERATION OF MISTS! STRICT HYGIENE!	
• INHALATION	Dizziness. Drowsiness. Headache. Nausea. Weakness. Unconsciousness. Death.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Artificial respiration may be needed. Refer for medical attention.
• SKIN	Dry skin. Redness. Burning sensation.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• EYES	Redness. Pain. Severe deep burns.	Safety goggles , face shield or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION	Abdominal pain. (Further see Inhalation).	Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth. Do NOT induce vomiting. Give plenty of water to drink. Rest.
SPILLAGE DISPOSAL		STORAGE	PACKAGING & LABELLING
Personal protection: filter respirator for organic gases and vapours. Do NOT let this chemical enter the environment. Ventilation. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand		Separated from metals (see Chemical Dangers), food and feedstuffs . Cool. Ventilation along the floor.	Do not transport with food and feedstuffs. Xn symbol R: 40 S: (2-)23-24/25-36/37 UN Hazard Class: 6.1 UN Packing Group: III

or inert absorbent and remove to safe place.		
I M P O R T A N T D A T A	PHYSICAL STATE; APPEARANCE: COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR.	ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation and by ingestion.
	PHYSICAL DANGERS: The vapour is heavier than air. As a result of flow, agitation, etc., electrostatic charges can be generated.	INHALATION RISK: A harmful contamination of the air can be reached very quickly on evaporation of this substance at 20°C.
	CHEMICAL DANGERS: On contact with hot surfaces or flames this substance decomposes forming toxic and corrosive fumes. Reacts violently with metals such as aluminium powder and magnesium powder, strong bases and strong oxidants causing fire and explosion hazard. Attacks some forms of plastic rubber and coatings.	EFFECTS OF SHORT-TERM EXPOSURE: The substance is irritating to the eyes , the skin and the respiratory tract . Exposure could cause lowering of consciousness. Exposure could cause the formation of methaemoglobin.
	OCCUPATIONAL EXPOSURE LIMITS: TLV: 50 ppm as TWA; A3 (confirmed animal carcinogen with unknown relevance to humans); BEI issued; (ACGIH 2004). MAK: Carcinogen category: 3A; (DFG 2004). OSHA PEL: 1910.1052 TWA 25 ppm ST 125 ppm NIOSH REL: Ca See Appendix A NIOSH IDLH: Ca 2300 ppm See: 75092	EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: Repeated or prolonged contact with skin may cause dermatitis. The substance may have effects on the central nervous system and liver . This substance is possibly carcinogenic to humans.
PHYSICAL PROPERTIES	Boiling point: 40°C Melting point: -95.1°C Relative density (water = 1): 1.3 Solubility in water, g/100 ml at 20°C: 1.3 Vapour pressure, kPa at 20°C: 47.4	Relative vapour density (air = 1): 2.9 Relative density of the vapour/air-mixture at 20°C (air = 1): 1.9 Auto-ignition temperature: 556°C Explosive limits, vol% in air: 12-25 Octanol/water partition coefficient as log Pow: 1.25

HASP #: 2014-033 Rev 2

Expiration Date: 06/30/2017

ENVIRONME NTAL DATA	This substance may be hazardous in the environment; special attention should be given to ground water contamination.	
NOTES		
<p>Addition of small amounts of a flammable substance or an increase in the oxygen content of the air strongly enhances combustibility. Depending on the degree of exposure, periodic medical examination is suggested. The odour warning when the exposure limit value is exceeded is insufficient. Do NOT use in the vicinity of a fire or a hot surface, or during welding. R30 is a trade name. Card has been partly updated in April 2005. See section Occupational Exposure Limits.</p> <p>Transport Emergency Card: TEC (R)-61S1593</p> <p>NFPA Code: H2; F1; R0;</p>		
ADDITIONAL INFORMATION		
<p>IMPORTANT LEGAL NOTICE:</p>	<p>Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.</p>	

To: Conmy, Robyn[Conmy.Robyn@epa.gov]
From: Holder, Edith
Sent: Sun 10/18/2015 8:29:42 PM
Subject: Reference oils
Ref_oils_BFT.xlsx

Here is the file with the BFT results for both Dorado and Endicott, including oil alone without dispersant. We can talk briefly tomorrow if you have any questions.

Edith Holder

Pegasus Technical Services, Inc.

On-Site Contractor to the U.S. EPA

ORD/NRMRL/LRPCD

26 W. Martin Luther King Dr.

Cincinnati, OH 45268

Phone: 513-569-7178

Email: holder.edith@epa.gov

To: Conmy, Robyn[Conmy.Robyn@epa.gov]
From: Clark, Patrick
Sent: Tue 5/10/2016 6:32:45 PM
Subject: RE: PR cancel

Willdo , thanks

From: Conmy, Robyn
Sent: Tuesday, May 10, 2016 2:07 PM
To: Clark, Patrick <Clark.Patrick@epa.gov>
Subject: PR cancel

Please cancel the PR for finasol purchase. Thank you.

[illegible]

Robyn N. Conmy, Ph.D.

Research Ecologist

USEPA/NRMRL/LRPCD

26 West MLK Drive

Cincinnati, Ohio 45268

513-569-7090 (office)

513-431-1970 (EPA mobile)

727-692-5333 (Personal mobile)

conmy.robbyn@epa.gov

To: Master, Kara[Master.Kara@epa.gov]
Cc: Conmy, Robyn[Conmy.Robyn@epa.gov]; Venkatapathy, Raghuraman[Venkatapathy.Raghuraman@epa.gov]
From: Holder, Edith
Sent: Tue 5/10/2016 6:13:08 PM
Subject: RE: HASP Annual Review Due
2014-033 Oil Spill HASP May2016 clean.docx
2014-033 Oil Spill HASP May2016 w track changes.docx

Attached is a revised HASP, 2 versions, one with track changes and the other clean.

Edie Holder

From: Master, Kara
Sent: Wednesday, May 04, 2016 4:57 PM
To: Lytle, Darren <Lytle.Darren@epa.gov>; Rhodes, Eric <Rhodes.Eric@epa.gov>; Brinkman, Nichole <Brinkman.Nichole@epa.gov>; Cashdollar, Jennifer <Cashdollar.Jennifer@epa.gov>; Gonsoulin, Mary <Gonsoulin.Mary@epa.gov>; Hargrove, Kristie <Hargrove.Kristie@epa.gov>; Brooks, Michael <Brooks.Michael@epa.gov>; Wood, Lynn <Wood.Lynn@epa.gov>; Wilkin, Rick <Wilkin.Rick@epa.gov>; Beak, Doug <Beak.Doug@epa.gov>; Borst, Michael <Borst.Mike@epa.gov>; Acree, Steven <Acree.Steven@epa.gov>; Conmy, Robyn <Conmy.Robyn@epa.gov>; Holder, Edith <holder.edith@epa.gov>; Luxton, Todd <Luxton.Todd@epa.gov>; Scheckel, Kirk <Scheckel.Kirk@epa.gov>; Platten, William <Platten.William@epa.gov>; Al-Abed, Souhail <al-abad.souhail@epa.gov>; Zhang, Zhenyuan <Zhang.Zhenyuan@epa.gov>; Tolaymat, Thabet <Tolaymat.Thabet@epa.gov>; Tegenaw, Ayenachew <Tegenaw.Ayenachew@epa.gov>; Batt, Angela <Batt.Angela@epa.gov>; Lazorchak, Jim <Lazorchak.Jim@epa.gov>; Biales, Adam <Biales.Adam@epa.gov>; Bencic, David <Bencic.David@epa.gov>; Adams, William <Adams.William@epa.gov>; Zaffiro, Alan <Zaffiro.Alan@epa.gov>; Domino, Mark <Domino.Mark@epa.gov>; Rosenblum, Laura <rosenblum.laura@epa.gov>; Verma, Sanny <Verma.Sanny@epa.gov>; Varma, Rajender <Varma.Rajender@epa.gov>; Szabo, Jeff <Szabo.Jeff@epa.gov>; Buse, Helen L. <Buse.Helen@epa.gov>; Rodgers, Mark <Rodgers.Mark@epa.gov>; Triantafyllidou, Simoni <Triantafyllidou.Simoni@epa.gov>; White, Colin <white.colin@epa.gov>; Schock, Michael <Schock.Michael@epa.gov>; Parrett, Christopher <Parrett.Christopher@epa.gov>; See, Mary Jean <See.MaryJean@epa.gov>
Cc: Musson, Steve <Musson.Steve@epa.gov>; Henderson, Gerard <Henderson.Gerard@epa.gov>; Adair, Cherri <adair.cherri@epa.gov>; Binford, Mitchell <binford.mitchell@epa.gov>
Subject: HASP Annual Review Due

Everyone,

You are getting this email because your HASP is due for its annual review in May or June.

One of the staff listed below for each HASP, please take a moment to review the HASP and respond to this email by either:

1. State "The HASP is current and no changes need to be made"
2. State "The HASP is no longer necessary, please inactivate it"
3. Send the HASP back to me with any changes that need to be made to revise it.

Division	HASP #	Rev #	Title	Date Review Due	Principal Investigator #1	Principal Investigator #2	Principal Investigator #3	Prepared By	Branch	Expire Date
EMN	2015036	50	RESPIRATORY CHAMBER/CONTAINMENT SYSTEM (ROOM 761 of AWBERC ANIMAL CARE FACILITY)	6/30/2016	Lye, Dennis			Lye, Dennis	MEB	6/30/2016
EMN	2015046	50	Pre-PCR reagent preparation and PCR amplification	6/30/2016	Chodes, Eric	Brinkman, Gerald	Chodes, Jeff	Chodes, Jeff	MEB	6/30/2016
GW	2014023	41	Laboratory 4	5/30/2016	Gossoulin, Mary			Hargrove, Kristin	SRB	6/30/2016
GW	2014032	40	Predicting DNAPL Source Zone and Plume Response Using Site Measured Characteristics	6/30/2016	Brooks, Wendy	Wood, Lynn		Wood, Lynn	SRB	6/30/2016
GW	2015048	50	Operation of the FTIR and Raman Spectrometers	6/30/2016	Wick, Rick			Adair, Chris	SRB	6/30/2016
GW	2015052	50	Water Sampling For Investigation of Green Infrastructure Methods and Technologies and their Effectiveness in Reducing Stormwater Runoff and Improving Water Quality at a Pilot Site in Ft. Riley, KS	6/30/2016	Doak, Deborah	Borst, Michael	Doak, Deborah	Doak, Deborah	SRB	6/30/2016
LRP	2014033	41	Oil Spill Research Including Work with Dispersants, Surface	6/30/2016	Combs, Robyn			Holder, Eileen	SRB	6/30/2016

		Washing Agents (SWAs), and Oil Degrading Microbes								
LRP	20151018	Characterization Of Nanoparticles In Wood Based Consumer Products	6/17/2016	Abelton, Ted	Schuckel, Kirk	Platten, Wayne	WMB	6/31/2016		
LRP	20150030	Nanomaterials Fate and Transport: Research Support	6/30/2016	Abed, Souhail		Zhang, Zhiyong	WMB	6/31/2016		
LRP	20150039	Environmental Characterization and Leaching of Copper Nanoparticles	6/30/2016	Alkayman, Thabet	Abed, Souhail	Tegenaw, Wymond	WMB	6/30/2016		
SED	20140016	Aquatic Studies Analytical Support using Solid Phase Extraction and Gas Chromatography/Mass Spectrometry	6/30/2016	Angela		See, Mary Jean	EFA	6/30/2016		
SED	20140077	Health and Safety Plan for use with Aquatic Facility Culturing and Toxicity Testing Activities	6/11/2016	Forchuck, Brian	Allos, Albert	Bancic, David	Forchuck, Brian	6/23/2016		
SRM	20140039	Second Laboratory Demonstration for Microcystins in Drinking Water using Solid-Phase Extraction and Liquid Chromatography/Mass Spectrometry	6/30/2016	Edwards, William		Zaffiro, Anthony	TSC	6/30/2016		
SRM	20150045	Analysis of Cylindrospermopsin in Drinking Water by Enzyme-Linked Immunosorbent Assay (ELISA)	5/31/2016	Domino, Mark		Zaffiro, Anthony	TSC	6/30/2016		
SRM	20150050	Analysis of microcystins in drinking water using oxidative cleavage of the ADDA side chain with determination by LC/MS	6/30/2016	Rosenblum, Laura		Rosenblum, Laura	TSC	6/30/2016		
STD	20140003	Highly Selective Photosynthesis Processes over Visible-Light-Induced Micro- and Nano-structured Photocatalysts	5/31/2016	Verma, Sanjay	Verma, Rajender	Verma, Sanjay	GDP	6/31/2016		
STD	20150031	Sustainable Materials Management: Platform for Utilization of Earth-abundant materials and Waste	5/31/2016	Verma, Rajender		Verma, Sanjay	GDP	5/31/2016		
WIP	20150053	Inactivation of Legionella spp. within drinking water biofilms	6/30/2016	Eugene	Szabo, Jeff	Buse, Helen	None	6/30/2016		
WSV	20140025	Water Quality Monitoring in Hospitals Before/After Copper-Silver Ionization	6/30/2016	De, Darin	Rodgers, Mark	Thidota, Shihong	WMB	6/30/2016		

WSV2014-083	The Effect of Water Chemistry on the Electrophoretic Mobility and Hydrophobicity of Microorganisms in Aqueous Solutions	5/13/2016	White, Colin		White, Colin	5/13/2016
WSV2015-049	Total C, Total S and Inorganic C for solids; total alkalinity and chloride for water samples	6/30/2016	Schock, Michael		Parrett, Christopher	6/30/2016

Cheers,

Kara Master

Booz | Allen | Hamilton

Tel. (513) 569-7786

Contractor to EPA / ORD NRMRL SHEM Office

POC: Stephen Musson
26 W. Martin Luther King Dr.
Room G74A
Cincinnati, Ohio 45268

Master_Kara@bah.com

Master.Kara@epa.gov

To: Conmy, Robyn[Conmy.Robyn@epa.gov]
Cc: Moeykens, Michael[Moeykens.Michael@epa.gov]; Corn, Ruth[Corn.Ruth@epa.gov];
raghuraman.venkatapathy@ptsied.com[raghuraman.venkatapathy@ptsied.com]
From: Venkatapathy, Raghuraman
Sent: Tue 5/10/2016 6:00:03 PM
Subject: Finasol purchase request
Inv 150212 Sample charge.pdf

Hi Robyn,

We would like to purchase 2 gallons of the dispersant finasol from Clear Coat LLC. If you approve of this purchase request, can you please send an email to Michael Moeykens and Ruth Corn stating your approval? This will be under WA 0-05.

Thanks,

raghu

Raghuraman Venkatapathy
On-Site Technical Manager
Pegasus Technical Services, Inc.
On-Site Contractor to U.S. EPA
NRMRL-STD/LRPCD, MS: 443
26 W. Martin Luther King Jr. Drive
Cincinnati, OH 45268.
Phone: (513) 569 7077 (O)/(513) 549 7880 (GV)
Fax: (513) 569 7677.
e-mail: venkatapathy.raghuraman@epa.gov

raghuraman.venkatapathy@ptsied.com



CLEAR COAST LLC
24044 Cinco Village Center Blvd, Suite 100
Katy, TX 77494
(832) 244-1533
admin@clearcoastllc.com
www.clearcoastllc.com

BILL TO
Pegasus Technical Service

SHIP TO
Pegasus Technical Service)

INVOICE 150212

DATE 04/26/2016 TERMS Payment due on receipt of product

DUE DATE 04/29/2016

TRACKING NO.
Sample

ACTIVITY	QTY	RATE	AMOUNT
Finasol OSR 52 DAP 2 US GALLONS		788.00	788.00

Electronic payment:-
Amegy Bank N.A.
ABA number 113011258
Clear Coast LLC
Account : 5791940660
Swift number SWBKUS44
Remiit checks to
Clear Coast LLC
24044 Cinco Village Center Blvd, Suite 100,
Katy TX 77494 USA

TOTAL DUE \$788.00

CLEAR COAST LLC

ED_001324_00000183-00001

To: raghuraman.venkatapathy@ptsied.com[raghuraman.venkatapathy@ptsied.com]
Cc: Conmy, Robyn[Conmy.Robyn@epa.gov]; Malcolm Gore[malcolm.gore@clearcoastllc.com]
From: Admin Clearcoast
Sent: Tue 5/10/2016 4:51:56 PM
Subject: Invoice for sample
[Inv 150212 Sample charge.pdf](#)

Invoice has been adjusted as suggested below.
Please see attached
Thank you

From: "Conmy, Robyn" <Conmy.Robyn@epa.gov>
Date: May 10, 2016 at 11:00:45 AM CDT
To: Malcolm Gore <malcolm.gore@clearcoastllc.com>
Cc: "raghuraman.venkatapathy@ptsied.com" <raghuraman.venkatapathy@ptsied.com>
Subject: RE: Finasol OSR 52 Sample Request

Hi Malcolm,

Apparently purchasing via check is problematic for the EPA. Can you cancel the existing invoice entirely and create a new one with the billing and ship to information for our on-site technical services contractor (Pegasus Technical Service)? They do much of our supply purchasing and can pay via check. I have cc'd their on-site manager, Raghu for coordination.

Sorry for any inconvenience and thank you!

Robyn

Admin



www.clearcoastllc.com



CLEAR COAST LLC
24044 Cinco Village Center Blvd, Suite 100
Katy, TX 77494
(832) 244-1533
admin@clearcoastllc.com
www.clearcoastllc.com

BILL TO
Pegasus Technical Service

SHIP TO
Pegasus Technical Service)

INVOICE 150212

DATE 04/26/2016 TERMS Payment due on receipt of product

DUE DATE 04/29/2016

TRACKING NO.
Sample

ACTIVITY	QTY	RATE	AMOUNT
Finasol OSR 52 DAP 2 US GALLONS		788.00	788.00

Electronic payment:-
Amegy Bank N.A.
ABA number 113011258
Clear Coast LLC
Account : 5791940660
Swift number SWBKUS44
Remiit checks to
Clear Coast LLC
24044 Cinco Village Center Blvd, Suite 100,
Katy TX 77494 USA

TOTAL DUE \$788.00

CLEAR COAST LLC

ED_001324_00000185-00001

To: Conmy, Robyn[Conmy.Robyn@epa.gov]
From: Theriot, Debby
Sent: Tue 5/10/2016 4:11:42 PM
Subject: RE: Availability of COREXIT Products for Testing
US EPA - 2016-E10-01.pdf

Robyn,

Thank you for the reminder.

Please see the attached quotation listing the product request. Pricing is the same for these products on a global basis.

Debby Theriot

Nalco Environmental Solutions LLC

7705 Highway 90-A

Sugar Land, TX 77478

debby.theriot@nalco.com

www.nalcoesllc.com



From: Conmy, Robyn [mailto:Conmy.Robyn@epa.gov]
Sent: Tuesday, May 10, 2016 6:29 AM
To: Theriot, Debby
Subject: RE: Availability of COREXIT Products for Testing

Hello Debby,

Keep in mind that we will need to pay for the product prior to Nalco shipping it to us. When you have the invoice, please send it our way for payment.

Thank you,

Robyn

[illegible]

Robyn N. Conmy, Ph.D.

Research Ecologist

USEPA/NRMRL/LRPCD

26 West MLK Drive

Cincinnati, Ohio 45268

513-569-7090 (office)

513-431-1970 (EPA mobile)

727-692-5333 (Personal mobile)

conmy.robbyn@epa.gov

From: Theriot, Debby [<mailto:Debby.Theriot@nalco.com>]
Sent: Thursday, April 28, 2016 11:19 AM
To: Conmy, Robyn <Conmy.Robyn@epa.gov>; Principe, Vanessa <Principe.Vanessa@epa.gov>
Cc: Matthiessen, Craig <Matthiessen.Craig@epa.gov>; Wilson, Gregory <Wilson.Gregory@epa.gov>; DeHaven, Leigh <DeHaven.Leigh@epa.gov>
Subject: RE: Availability of COREXIT Products for Testing

Thank you Robyn,

I've added your request to the queue and will follow up for status.

debby

From: Conmy, Robyn [<mailto:Conmy.Robyn@epa.gov>]
Sent: Thursday, April 28, 2016 6:22 AM
To: Principe, Vanessa; Theriot, Debby
Cc: Matthiessen, Craig; Wilson, Gregory; DeHaven, Leigh
Subject: RE: Availability of COREXIT Products for Testing

Hello Debby,

As Vanessa stated in her email, EPA safeguards CBI, which extends to your products. As for the shipping information, please use my contact information below and add 'mail stop 173' to the street address. Yes, we will need an invoice for the products, which can be paid to you via credit card. Thank you for making arrangements for us to purchase the samples.

Cheers,

Robyn

From: Theriot, Debby [<mailto:Debby.Theriot@nalco.com>]
Sent: Wednesday, April 27, 2016 10:42 AM
To: Principe, Vanessa <Principe.Vanessa@epa.gov>
Cc: Matthiessen, Craig <Matthiessen.Craig@epa.gov>; Wilson, Gregory <Wilson.Gregory@epa.gov>; DeHaven, Leigh <DeHaven.Leigh@epa.gov>; Conmy, Robyn <Conmy.Robyn@epa.gov>
Subject: RE: Availability of COREXIT Products for Testing

Thanks for the details Vanessa. We have never charged for samples, so I'll have to work on this arrangement. We will probably need to generate a manual invoice, called a "debit memo".

Market price per gallon for each product is below:

EC9500A \$45

EC9500B \$45

EC9527A \$47

Robyn, please send the shipping details and let me know if you need to provide a PO so I can write up a quotation. Also, are you able to confirm the confidentiality with respect to non-analysis and disclosure of the formula, as requested by our legal team?

Thanks,

debby

From: Principe, Vanessa [<mailto:Principe.Vanessa@epa.gov>]
Sent: Wednesday, April 27, 2016 8:48 AM
To: Theriot, Debby
Cc: Matthiessen, Craig; Wilson, Gregory; DeHaven, Leigh; Conmy, Robyn
Subject: RE: Availability of COREXIT Products for Testing

Debby:

Thank you for following up on this request.

EPA's Office of Research and Development (ORD) will be conducting the dispersant studies. The contact person for details of the purchase is Dr. Robyn Conmy of ORD. She can be reached at (513) 569-7090 and can get you the shipping details.

We appreciate the offer to provide the samples at no cost. However, to avoid the perception of conflicts of interest we make it a practice to purchase these products, even if it is for a nominal fee. At this time we are seeking 2 U.S. gallons of each of COREXIT EC9527A, EC9500A and EC9500B.

Again, we appreciate your time and attention to this request. Please feel free to contact me as well if you have any questions/concerns.

Thank you, Vanessa

From: Theriot, Debby [<mailto:Debby.Theriot@nalco.com>]
Sent: Wednesday, April 27, 2016 7:28 AM
To: Principe, Vanessa <Principe.Vanessa@epa.gov>
Subject: RE: Availability of COREXIT Products for Testing

Hi Vanessa,

If you can provide shipping details I can have the order placed in the queue.

Thanks,

debby

From: Theriot, Debby

Sent: Friday, April 22, 2016 3:02 PM

To: 'Principe, Vanessa'

Cc: Wilson, Gregory; Conmy, Robyn; Matthiessen, Craig; DeHaven, Leigh

Subject: RE: Availability of COREXIT Products for Testing

Hi Vanessa,

I have approval from legal to proceed without the need for NDA. They just ask that we “confirm that the formulation will not be disclosed”. I will have the sample team pull these for you and prepare for shipment. Please advise the shipping address.

Samples of products are provide at no cost.

Thanks,

Debby Theriot

Nalco Environmental Solutions LLC

7705 Highway 90-A

Sugar Land, TX 77478

832.851.5164 cell

debby.theriot@nalco.com

www.nalcoesllc.com



From: Principe, Vanessa [<mailto:Principe.Vanessa@epa.gov>]
Sent: Thursday, April 21, 2016 3:50 PM
To: Theriot, Debby
Cc: Wilson, Gregory; Conmy, Robyn; Matthiessen, Craig; DeHaven, Leigh
Subject: RE: Availability of COREXIT Products for Testing

Debby:

Thank you for providing us with the NDA form.

It appears that your concern is for the protection of Confidential Business Information (CBI) specific to the formulation of your products. EPA safeguards CBI information under the requirements in 40 CFR Part 2, Subpart B. Specifically, for the products we are seeking, and which are already listed in the Product Schedule, current regulatory requirements address CBI under 40 CFR Part 300, Subpart J. These provisions should address your CBI concerns. EPA cannot enter into an NDA addressing CBI as it is bound by its regulations on such matters.

We are still interested in purchasing samples of these products for the purposes of both toxicity and efficacy testing. Given that the product testing is intended to support both regulatory actions under Subpart J and our general research in the area of oil spill response, any toxicity and efficacy testing results would not be considered CBI.

Please advise on how to proceed with this purchase.

Again, thank you for your attention to this matter,

Vanessa

From: Theriot, Debby [<mailto:Debby.Theriot@nalco.com>]
Sent: Wednesday, April 20, 2016 1:09 PM
To: Principe, Vanessa <Principe.Vanessa@epa.gov>
Cc: Wilson, Gregory <Wilson.Gregory@epa.gov>; Conmy, Robyn <Conmy.Robyn@epa.gov>;
Matthiessen, Craig <Matthiessen.Craig@epa.gov>; DeHaven, Leigh
<DeHaven.Leigh@epa.gov>
Subject: RE: Availability of COREXIT Products for Testing

Hi Vanessa,

The standard format is attached. Details and scope are filled in by our paralegal once we receive from the requesting party.

debby

From: Principe, Vanessa [<mailto:Principe.Vanessa@epa.gov>]
Sent: Tuesday, April 19, 2016 1:33 PM
To: Theriot, Debby

Cc: Wilson, Gregory; Conmy, Robyn; Matthiessen, Craig; DeHaven, Leigh

Subject: RE: Availability of COREXIT Products for Testing

Ms. Theriot:

Thank you for getting back to me. My apologies, but my voice mail did not have any recorded messages from you.

Could you please send us a copy of your NDA for our Office of General Counsel to review?

Thank you for your attention to this matter,

Vanessa

From: Theriot, Debby [<mailto:Debby.Theriot@nalco.com>]

Sent: Tuesday, April 19, 2016 1:59 PM

To: Principe, Vanessa <Principe.Vanessa@epa.gov>

Cc: Wilson, Gregory <Wilson.Gregory@epa.gov>; Conmy, Robyn <Conmy.Robyn@epa.gov>; Matthiessen, Craig <Matthiessen.Craig@epa.gov>; DeHaven, Leigh <DeHaven.Leigh@epa.gov>

Subject: RE: Availability of COREXIT Products for Testing

Hi Vanessa,

I believe I left a voicemail in return last week. For the release of products for testing, we require testing details for each product to be disclosed and NDA to be executed. Are you able to assist in the process?

I will be able to release samples free of any cost to you once the NDA's are fully executed.

Debby Theriot

Nalco Environmental Solutions LLC

7705 Highway 90-A

Sugar Land, TX 77478

832.851.5164 cell

debby.theriot@nalco.com

www.nalcoesllc.com



From: Principe, Vanessa [<mailto:Principe.Vanessa@epa.gov>]

Sent: Monday, April 18, 2016 11:10 AM

To: Theriot, Debby

Cc: Wilson, Gregory; Conmy, Robyn; Matthiessen, Craig; DeHaven, Leigh

Subject: Availability of COREXIT Products for Testing

Ms. Theriot,

This follows up my voice mails of last week and today.

Per my message, EPA is seeking to acquire a number of dispersant products listed on the NCP Subpart J Product Schedule for the purposes of both toxicity and efficacy testing. The product testing is intended to further inform currently proposed regulatory actions under Subpart J of the National Contingency Plan. The products will in addition be used to support our general research in the area of oil spill response.

Three of your products [COREXIT EC9527A, EC9500A and EC9500B] have been identified as of interest, as they are commonly stockpiled in the U.S. Not only could these products be encountered when presented with a response situation, but including these dispersant products in toxicity and efficacy testing studies will also allow for comparison and consistency with other existing and ongoing studies by EPA and other federal agencies. EPA's Office of Research and Development (ORD) will be conducting the dispersant studies.

At this time we are seeking 2 U.S. gallons of each of the products.

You can contact either me or Greg Wilson at 202-564-7989. We appreciate your time and attention to this request and look forward to talking to you.

Respectfully,

Vanessa Principe

Vanessa Principe

202-564-7913

Chemical Engineer

Office Of Emergency Management

Office of Land and Emergency Management

U.S. EPA

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QUOTATION

No. 2016-E10-01
Valid: 30 Days


Seller (Name and Address) Nalco Environmental Solutions LLC 7705 Highway 90-A Sugar Land TX 77478 Attn: Debby Theriot		Quotation Date: May 10, 2016	
		Other references (Include Purchasers Order Number)	
Consignee (Name and Address)		Purchasers Name and Address (If other than Consignee) Robyn N. Conmy, PhD USEPA/ NRMRL / LRPCD Mail Stop 73 25 West MLK Drive Cincinnati, OH 45268 (513) 569-7090	
Remit to: Company Code: 1080 Account Name: Nalco Environmental Solutions LLC Bank Name: Bank of America ABA: 026009593 SWIFT: BOFAUS3N Account Number: 4427147746 IBAN number: N/A Currency: USD		Country Of Origin of Goods USA	
8. Transportation: Give Mode and Place of Direct Shipment		9. Conditions of Sale and Terms of Payment (I.e. Sale, Consignment, Leased Goods, etc.) EXW - SUGAR LAND, TX USA	
		Terms of Payment / Currency of Settlement 30 days from delivery	
Quantity	Description	13. Quantity (State Unit)	14. Unit Price
2	COREXIT® EC9500A	1 gals	\$45.00
2	COREXIT® EC9500B	1 gals	\$45.00
2	COREXIT® EC9527A	1 gals	\$47.00
EXW - SUGAR LAND, TX, USA Nalco Terms and Conditions apply to this Quotation Indemnity Agreement necessary for order processing Please submit Tax Exemption Certificate (if necessary) Orders contingent on legal and credit review Order contingent on regulatory approval I hereby certify that the above bill is correct and just; and that the said goods are the product of the soil or industry of the United States of America. These commodities, technology, or software were exported from the United States in accordance with the export administration regulations for the ultimate destination - Argentina Diversion contrary to U.S. law is prohibited. We Certify this invoice is true and correct: Nalco Environmental Solutions LLC			15. Total
<i>estimated costs</i>			Total Value
			\$274.00

USD

Cincinnati, Ohio 45268

513-569-7090  (office)

513-431-1970  (EPA mobile)

727-692-5333  (Personal mobile)

conmy.robyn@epa.gov

513-569-7090 (office)

513-431-1970 (EPA mobile)

727-692-5333 (Personal mobile)

conmy.robyn@epa.gov

From: Barron, Mace

Sent: Monday, May 09, 2016 10:20 AM

To: Conmy, Robyn <Conmy.Robyn@epa.gov>

Subject: two abs reviews attached

The Zhang one needs a little work!

**Comparative Study to Determine the Biodegradability of Dispersants
at Environmentally Relevant Concentration**

Yu Zhang¹, Mobing Zhuang¹, Pablo Campo², Ruta Suresh Deshpande¹, Devi Sundaravadivelu³, Robyn N. Conmy⁴ and Jorge W. Santo Domingo⁴

1. Department of Biomedical, Chemical and Environmental Engineering, University of Cincinnati, 2901 Woodside Drive, Cincinnati, OH 45221, USA

2. Cranfield Water Science Institute, Cranfield University, Cranfield MK43 0AL, UK

3. Pegasus Technical Services Inc., 46 E Hollister Street, Cincinnati, OH 45219, USA

4. U.S. Environmental Protection Agency, National Risk Management Risk Laboratory, 26 W. MLK Drive Cincinnati, OH 45268, USA

Abstract

Chemical dispersant agents reduces the interfacial tension between the oil and water, increases the surface area to volume ratio of oil droplets and thus facilitates the biodegradation of spilled oil. Dispersants are composed of surface active molecules known as surfactants and various commercial products contain Dioctyl Sulfosuccinate (DOSS) as the active ingredient. Since previous laboratory studies including the BFT were conducted at oil and dispersant concentrations significantly higher (~0.7 g/L oil with DOR of 1:25) than those typically found in field conditions, experiments were conducted at low levels of oil and dispersant (28 µg/L oil with DOR of 1:25) in order to determine the degradation trends at environmentally relevant concentrations. Experiments were conducted using two crude oils (Alaskan North Slope and Endicott) and two dispersant products (Corexit 9500 and Finalsol OSR 52) to study the biodegradation of dispersants and dispersed oil and oil alone samples were used as controls. Two oil degrading cultures, isolated from the surface (meso) and deep sea (cryo) of the Gulf of Mexico, were enriched on crude oil at 25 °C and 5 °C and were used as the inocula. The biodegradation experiments were performed at 5 °C for 56 days and at 25 °C for 48 days using sterile GP2 artificial seawater as the media. The time series concentration of DOSS, the primary surfactant in the dispersants was monitored using LC-MS/MS in addition to the oil concentration which was measured using GC-MS/MS. Although the initial concentration of DOSS in Finalsol OSR 52 was 25% higher than in Corexit 9500, over 95% of the anionic surfactant fraction was metabolized for both types of dispersant products by the end of the experiment at 25°C while it persisted at 5°C. The effect of dispersant and oil type on microbial community structure was also analyzed using PCR analysis. Results indicated that the abundance of *Thalassospira* correlated well with hydrocarbon degradation trends. The results from this study significantly expands on our understanding of biodegradation of DOSS, dispersed and non-dispersed oil and also provides information regarding bacterial community composition.

Keywords: biodegradation, oil spills, dispersant, crude oil, RNA

2017 International Oil Spill Conference

Biodegradability of Low Concentration Dispersants at 5 °C and 25 °C

Yu Zhang¹, Mobing Zhuang¹, Pablo Campo², Ruta Suresh Deshpande¹, and Robyn N. Conmy³

1. Department of Biomedical, Chemical and Environmental Engineering, University of Cincinnati, 2901 Woodside Drive, Cincinnati, OH 45221, USA

2. Cranfield Water Science Institute, Cranfield University, Cranfield MK43 0AL, UK

3. U.S. Environmental Protection Agency, National Risk Management Risk Laboratory, 26 W. MLK Drive Cincinnati, OH 45268, USA

Abstract

Pollution caused by oil spills is devastating for the environment as spilled oil could prevent the photosynthesis and respiration of marine organisms. Dispersant is one of the essential oil spill countermeasures that can stimulate the biodegradation of spilled oil. Chemical dispersants act on spilled oil by breaking down slicks into micron-sized buoyant droplets with high surface area, which facilitates evaporation and biodegradation. Since previous laboratory studies were conducted at substrate concentrations significantly higher than those found in field conditions, experiments were conducted at low concentrations of oil and dispersant in order to produce environmentally relevant biodegradation data. Three laboratory experiments at 5 and 25 °C were conducted in sterile GP2 artificial seawater to explain the biodegradability of the anionic surfactant in dispersant and dispersed crude oil. The first batch consisted of Alaska North Slope crude oil and Corexit 9500, a second one with Alaska North Slope crude oil and Finasol OSR 52, and finally Endicott crude oil and Corexit 9500. Two oil degrading cultures, isolated from the surface (meso) and deep sea (cryo) of the Gulf of Mexico, were enriched on crude oil at 25 °C and 5 °C and were used as the inocula. Time series concentration for the anionic surfactant in dispersants was determined. Results indicated that the anionic surfactant was biodegraded by meso culture, while it persisted at the lower temperature. Although the initial concentration of dioctyl sodium sulfosuccinate in Finasol OSR 52 was 25% higher than in Corexit 9500, over 95% of the anionic surfactant fraction was metabolized for both types of dispersant products by the end of the experiment.

2017 International Oil Spill Conference

Keywords: biodegradation, oil spills, dispersant, crude oil

Round-Robin Testing of a New EPA Solidifier Effectiveness Protocol

Devi Sundaravadivelu¹, Robyn N. Conmy², Pablo Campo-Moreno³

1. Pegasus Technical Services Inc., 46 E Hollister Street, Cincinnati, OH 45219, USA
 2. U.S. EPA, National Risk Management Risk Laboratory, 26 W. MLK Drive Cincinnati, OH, 45268, USA
 3. Cranfield Water Science Institute, Cranfield University, Cranfield MK43 0AL, UK
-

A new laboratory testing protocol for evaluating effectiveness of solidifiers in removing crude oil slicks on the water surface has been developed by the EPA. Since an assessment of a testing protocol requires validation through an inter laboratory study with several independent research partners, a round-robin test was performed by five operators across two laboratories. The protocol was qualitatively and quantitatively evaluated to determine if it can satisfactorily differentiate efficient and mediocre products while still accounting for experimental and operational errors. Each operator evaluated the efficiency of six solidifier products using Arabian Light, Endicott and IFO 120 crude oils and all experiments were carried out in triplicate. Additionally, an oil alone control sample was run for quality control purposes. The five operators were provided with all the supplies required to conduct the experiment and a detailed standard operating procedure which included visual aids such as photos and videos. The results were collected and analyzed statistically to quantify repeatability and reproducibility.

The repeatability (within-operator error) comprised mostly of the inherent error in the method while quantifying a product's ability to solidify oil. Overall, 95% of the total samples had error values under 6.5%, and the average repeatability for each of the operators was 1.9%, 2.7%, 2.8%, 3.9% and 4.3%. The reproducibility (between-operator error) based on carefully conducted experiments by the independent analysts ranged between 3.3% and 14.9%. For experiments conducted with Arabian Light and Endicott crude oil, the average reproducibility was 8.6% and 7.7% respectively, while it was 11.8% for IFO 120. Due to the increased viscosity of the heavier oil and difficulty in separating the solidified and un-solidified mass, the inter-operator and intra-operator errors were both larger. The oil alone control had an average repeatability and reproducibility of 2.7% and 5.5% respectively. The variability is deemed acceptable for purposes of screening effective from ineffective solidifier products in the laboratory. The results from this round robin experiment will serve as an initial screening tool for the solidifier products in the market and will help response teams determine the desirability and appropriateness of using a specific solidifier for oil spill remediation.

Keywords: Solidifiers; crude oil; round robin; protocol; repeatability; reproducibility.

To: Conmy, Robyn[Conmy.Robyn@epa.gov]
From: Holder, Edith
Sent: Wed 5/4/2016 6:12:53 PM
Subject: RE: Finasol OSR 52 Sample Request

Robyn,

Pat has the Finasol and it won't be released to me until he has straightened out the paperwork. While I was in his office, he spoke with Diana Redmond who assured him that the muddle wasn't as bad as he thought it was. It is my understanding that you will have to write a sole source justification. Pat has to get an invoice from them and some other information. Then Diana can write a "Convenience" check.

I talked with Raghu. He says that approval of the quote has to come from you through Michael Moeykens before he can issue a PR. At least that is my understanding of it. His thought is to issue a PR for ~ half of the work for this FY.

Edie

From: Conmy, Robyn
Sent: Wednesday, May 04, 2016 8:07 AM
To: Holder, Edith <holder.edith@epa.gov>
Subject: FW: Finasol OSR 52 Sample Request

Hi Edie,

The Finasol has already arrived. We are still working on taking care of the payment, but we do have it. So can you arrange to ship a portion to hydrosphere so they can begin the tox work? Still waiting on the Corexit but I figure they can start work with Finasol. I understand that the quote came back, so perhaps Raghu needs to accept them as a subcontractor first. Not sure where all this stands, but I'm sure he can fill you in. I'm off site this week and haven't seen the box, but it is either in room 173, my office or with Pat Clark.

Thanks,

[illegible]

Research Ecologist

26 West MLK Drive

513-569-7090 (office)

513-431-1970 (EPA mobile)

727-692-5333 (Personal mobile)

conmy.robbyn@epa.gov

Sent: Tuesday, May 03, 2016 6:38 AM

To: Conmy, Robyn <Conmy.Robyn@epa.gov>

Subject: RE: Finasol OSR 52 Sample Request

Yea I think he thought you ordered it then which is odd. I have to find out about the check but I don't have the PR back kyet to put it against. We'll take care of it. Enjoy the course...

Sent: Tuesday, May 03, 2016 6:32 AM

To: Clark, Patrick <Clark.Patrick@epa.gov>

Subject: RE: Finasol OSR 52 Sample Request

So the product already arrived??? Strange. Keep me posted on the status of the check. Don't think I have ever had to pay by check. Odd!

From: Malcolm Gore <malcolm.gore@clearcoastllc.com>

Date: May 2, 2016 at 11:19:03 AM EDT

To: "Conmy, Robyn" <Conmy.Robyn@epa.gov>

Subject: Re: Finasol OSR 52 Sample Request

Hello Robyn

This has been processed our side. We cannot accept credit cards and would ask for a check or direct transfer be made as per the invoice.

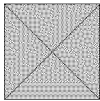
Please advise on payment timing

Thank you.

Malcolm

Malcolm Gore

President



+1 832 244 1533

malcolm.gore@clearcoastllc.com

www.clearcoastllc.com

From: "Conmy, Robyn" <Conmy.Robyn@epa.gov>

Date: Thursday, April 28, 2016 at 1:02 PM

To: malcolm gore <malcolm.gore@clearcoastllc.com>

Subject: RE: Finasol OSR 52 Sample Request

Yes we have received the invoice and I have provided our purchase card holder with the information. He will be contacting your office for payment.

Cheers,

Robyn

[illegible]

Robyn N. Conmy, Ph.D.

Research Ecologist

USEPA/NRMRL/LRPCD

26 West MLK Drive

Cincinnati, Ohio 45268

513-569-7090 (office)

513-431-1970 (EPA mobile)

727-692-5333 (Personal mobile)

conmy.robyn@epa.gov

From: Malcolm Gore [<mailto:malcolm.gore@clearcoastllc.com>]

Sent: Thursday, April 28, 2016 1:43 PM

To: Conmy, Robyn <Conmy.Robyn@epa.gov>

Subject: Re: Finasol OSR 52 Sample Request

Hi Robyn

I have given the go ahead on this. Please confirm receipt of the invoice sent yesterday.

Malcolm

Malcolm Gore

President

To: Conmy, Robyn <Conmy.Robyn@epa.gov>
Subject: Re: Finasol OSR 52 Sample Request

Apologies for the delay Robyn

Awaiting some shipping information. Should have this to you in the morning.

Malcolm

Malcolm Gore

President



+1 832 244 1533

malcolm.gore@clearcoastllc.com

www.clearcoastllc.com

From: "Conmy, Robyn" <Conmy.Robyn@epa.gov>
Date: Monday, April 25, 2016 at 10:05 AM
To: malcolm gore <malcolm.gore@clearcoastllc.com>
Cc: Peter Egan <peter.egan@total.com>
Subject: RE: Finasol OSR 52 Sample Request

Hello Malcolm,

Thank you for getting back with me regarding the purchase. Yes, the information below is correct, with a mail stop at room 166. Can you send to me the invoice via email so I can

Contact:

Robyn Conmy 513-569-7090 (office)

Deliver to:

26 West MLK Drive

Cincinnati, Ohio 45268

513-569-7090 (office)

Quantity:

2 US Gallons.

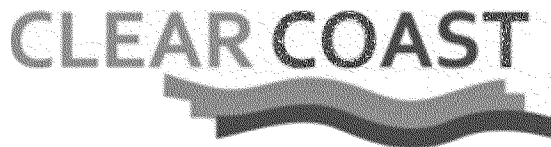
On receipt of confirmation I will get the samples drawn, packaged and dispatched.

Regards

Malcolm

Malcolm Gore

President



+1 832 244 1533

malcolm.gore@clearcoastllc.com

www.clearcoastllc.com

From: Conmy, Robyn
Sent: Monday, April 18, 2016 10:47 AM
To: 'peter.egan@total.com' <peter.egan@total.com>
Cc: Wilson, Gregory <Wilson.Gregory@epa.gov>; Principe, Vanessa <Principe.Vanessa@epa.gov>
Subject: purchase of Finasol OSR52

Mr. Egan,

This follows up our telephone conversation of April 11.

As discussed, EPA is seeking to acquire a number of dispersant products listed on the NCP Subpart J Product Schedule for the purposes of both toxicity and efficacy testing. The product testing is intended to further inform currently proposed regulatory actions under Subpart J of the National Contingency Plan. The products will in addition be used to support our general research in the area of oil spill response.

Your product Finasol OSR52 has been identified as one of interest, as it is commonly stockpiled in the U.S. Not only could the product be encountered when presented with a response situation, but including this dispersant product in toxicity and efficacy testing studies will also allow for comparison and consistency with other existing and ongoing studies by EPA and other federal agencies. EPA's Office of Research and Development (ORD) will be conducting the dispersant studies.

At this time we are seeking 2 U.S. gallons of the product.

We appreciate your time and attention to this request.

Robyn Conmy



To: Conmy, Robyn[Conmy.Robyn@epa.gov]
From: Clark, Patrick
Sent: Wed 5/4/2016 5:01:30 PM
Subject: RE: Finasol OSR 52 Sample Request

Hey Robyn, we have to get together on this. I can't find what I did with the invoice but I need some information before we can pay with a check. We need to talk Monday. Pat

From: Conmy, Robyn
Sent: Tuesday, May 03, 2016 6:32 AM
To: Clark, Patrick <Clark.Patrick@epa.gov>
Subject: RE: Finasol OSR 52 Sample Request

So the product already arrived??? Strange. Keep me posted on the status of the check. Don't think I have ever had to pay by check. Odd!

[illegible]

Robyn N. Conmy, Ph.D.

Research Ecologist

USEPA/NRMRL/LRPCD

26 West MLK Drive

Cincinnati, Ohio 45268

513-569-7090 (office)

513-431-1970 (EPA mobile)

727-692-5333 (Personal mobile)

conmy.robbyn@epa.gov

From: Clark, Patrick
Sent: Monday, May 02, 2016 12:05 PM
To: Conmy, Robyn <Conmy.Robyn@epa.gov>; Baldwin, Maxanne <Baldwin.Maxanne@epa.gov>
Subject: RE: Finasol OSR 52 Sample Request

The finasol is in even though I don't have my PR cleared yet. I think Diana Redmond can pay with a check. However we need a dcn which I hope I get soon (even though Marco is on vacation). Pat

From: Conmy, Robyn
Sent: Monday, May 02, 2016 11:33 AM
To: Baldwin, Maxanne <Baldwin.Maxanne@epa.gov>; Clark, Patrick <Clark.Patrick@epa.gov>
Subject: Fwd: Finasol OSR 52 Sample Request

Not sure how we can purchase this as they don't accept purchase cards? PR??

Sent from my iPhone

Begin forwarded message:

From: Malcolm Gore <malcolm.gore@clearcoastllc.com>
Date: May 2, 2016 at 11:19:03 AM EDT
To: "Conmy, Robyn" <Conmy.Robyn@epa.gov>
Subject: Re: Finasol OSR 52 Sample Request

Hello Robyn

This has been processed our side. We cannot accept credit cards and would ask for a check or direct transfer be made as per the invoice.

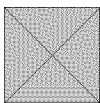
Please advise on payment timing

Thank you.

Malcolm

Malcolm Gore

President



Subject: Re: Finasol OSR 52 Sample Request

USEPA/NRMRL/LRPCD

26 West MLK Drive

Cincinnati, Ohio 45268

513-569-7090 (office)

513-431-1970 (EPA mobile)

727-692-5333 (Personal mobile)

conmy.robyn@epa.gov

From: Malcolm Gore [<mailto:malcolm.gore@clearcoastllc.com>]

Sent: Monday, April 25, 2016 5:45 PM

To: Conmy, Robyn <Conmy.Robyn@epa.gov>

Subject: Re: Finasol OSR 52 Sample Request

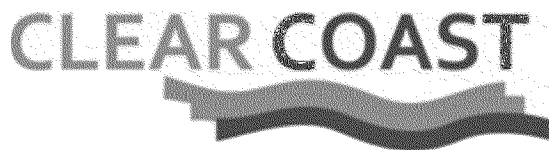
Apologies for the delay Robyn

Awaiting some shipping information. Should have this to you in the morning.

Malcolm

Malcolm Gore

President



+1 832 244 1533

malcolm.gore@clearcoastllc.com

From: "Conmy, Robyn" <Conmy.Robyn@epa.gov>
Date: Monday, April 25, 2016 at 10:05 AM
To: malcolm gore <malcolm.gore@clearcoastllc.com>
Cc: Peter Egan <peter.egan@total.com>
Subject: RE: Finasol OSR 52 Sample Request

Thank you for getting back with me regarding the purchase. Yes, the information below is correct, with a mail stop at room 166. Can you send to me the invoice via email so I can provide to the purchase card holder to make the purchase?

Robyn

conmy.robbyn@epa.gov

From: Malcolm Gore [<mailto:malcolm.gore@clearcoastllc.com>]
Sent: Monday, April 25, 2016 10:57 AM
To: Conmy, Robyn <Conmy.Robyn@epa.gov>
Cc: Peter Egan <peter.egan@total.com>
Subject: Finasol OSR 52 Sample Request

Hello Robin

I am writing with respect to your email below regarding a sample request of Total Finasol OSR 52.

Clear Coast is the custodian of the product stored here in Houston for Total.

I will arrange the sample as requested.

Please confirm the following:

Contact:

Robyn Conmy 513-569-7090 (office)

Deliver to:

26 West MLK Drive

Cincinnati, Ohio 45268

513-569-7090 (office)

Quantity:

2 US Gallons.

On receipt of confirmation I will get the samples drawn, packaged and dispatched.

Regards

Malcolm

Malcolm Gore

President



+1 832 244 1533

malcolm.gore@clearcoastllc.com

www.clearcoastllc.com

From: Conmy, Robyn

Sent: Monday, April 18, 2016 10:47 AM

To: 'peter.egan@total.com' <peter.egan@total.com>

Cc: Wilson, Gregory <Wilson.Gregory@epa.gov>; Principe, Vanessa <Principe.Vanessa@epa.gov>

Subject: purchase of Finasol OSR52

Mr. Egan,

This follows up our telephone conversation of April 11.

As discussed, EPA is seeking to acquire a number of dispersant products listed on the NCP Subpart J Product Schedule for the purposes of both toxicity and efficacy testing. The product testing is intended to further inform currently proposed regulatory actions under Subpart J of the National Contingency Plan. The products will in addition be used to support our general research in the area of oil spill response.

Your product Finasol OSR52 has been identified as one of interest, as it is commonly stockpiled in the U.S. Not only could the product be encountered when presented with a response situation, but including this dispersant product in toxicity and efficacy testing studies will also allow for comparison and consistency with other existing and ongoing studies by EPA and other federal agencies. EPA's Office of Research and Development (ORD) will be conducting the dispersant studies.

At this time we are seeking 2 U.S. gallons of the product.

We appreciate your time and attention to this request.

Respectfully,

Robyn Conmy

[illegible]

Robyn N. Conmy, Ph.D.

Research Ecologist

USEPA/NRMRL/LRPCD

26 West MLK Drive

Cincinnati, Ohio 45268

513-569-7090 (office)

513-431-1970 (EPA mobile)

727-692-5333 (Personal mobile)

conmy.robyn@epa.gov



To: Conmy, Robyn[Conmy.Robyn@epa.gov]
From: Clark, Patrick
Sent: Tue 5/3/2016 10:38:15 AM
Subject: RE: Finasol OSR 52 Sample Request

Yea I think he thought you ordered it then which is odd. I have to find out about the check but I don't have the PR back kyet to put it against. We'll take care of it. Enjoy the course...

From: Conmy, Robyn
Sent: Tuesday, May 03, 2016 6:32 AM
To: Clark, Patrick <Clark.Patrick@epa.gov>
Subject: RE: Finasol OSR 52 Sample Request

So the product already arrived??? Strange. Keep me posted on the status of the check. Don't think I have ever had to pay by check. Odd!

[illegible]

Robyn N. Conmy, Ph.D.

Research Ecologist

USEPA/NRMRL/LRPCD

26 West MLK Drive

Cincinnati, Ohio 45268

513-569-7090 (office)

513-431-1970 (EPA mobile)

727-692-5333 (Personal mobile)

conmy.robbyn@epa.gov

From: Clark, Patrick
Sent: Monday, May 02, 2016 12:05 PM
To: Conmy, Robyn <Conmy.Robyn@epa.gov>; Baldwin, Maxanne <Baldwin.Maxanne@epa.gov>
Subject: RE: Finasol OSR 52 Sample Request

The finasol is in even though I don't have my PR cleared yet. I think Diana Redmond can pay with a check. However we need a dcn which I hope I get soon (even though Marco is on vacation). Pat

From: Conmy, Robyn
Sent: Monday, May 02, 2016 11:33 AM
To: Baldwin, Maxanne <Baldwin.Maxanne@epa.gov>; Clark, Patrick <Clark.Patrick@epa.gov>
Subject: Fwd: Finasol OSR 52 Sample Request

Not sure how we can purchase this as they don't accept purchase cards? PR??

Sent from my iPhone

Begin forwarded message:

From: Malcolm Gore <malcolm.gore@clearcoastllc.com>
Date: May 2, 2016 at 11:19:03 AM EDT
To: "Conmy, Robyn" <Conmy.Robyn@epa.gov>
Subject: Re: Finasol OSR 52 Sample Request

Hello Robyn

This has been processed our side. We cannot accept credit cards and would ask for a check or direct transfer be made as per the invoice.

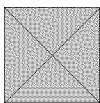
Please advise on payment timing

Thank you.

Malcolm

Malcolm Gore

President



USEPA/NRMRL/LRPCD

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513-431-1970 (EPA mobile)

727-692-5333 (Personal mobile)

conmy.robyn@epa.gov

From: Malcolm Gore [<mailto:malcolm.gore@clearcoastllc.com>]

Sent: Monday, April 25, 2016 5:45 PM

To: Conmy, Robyn <Conmy.Robyn@epa.gov>

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Malcolm

Malcolm Gore

President



+1 832 244 1533

malcolm.gore@clearcoastllc.com

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Subject: RE: Finasol OSR 52 Sample Request

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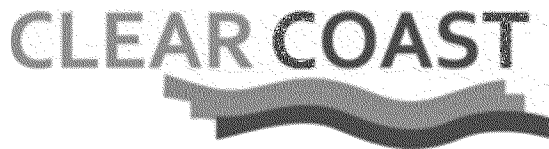
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Malcolm Gore

President



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malcolm.gore@clearcoastllc.com

www.clearcoastllc.com

From: Conmy, Robyn

Sent: Monday, April 18, 2016 10:47 AM

To: 'peter.egan@total.com' <peter.egan@total.com>

Cc: Wilson, Gregory <Wilson.Gregory@epa.gov>; Principe, Vanessa <Principe.Vanessa@epa.gov>

Subject: purchase of Finasol OSR52

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Respectfully,

Robyn Conmy

[illegible]

Robyn N. Conmy, Ph.D.

Research Ecologist

USEPA/NRMRL/LRPCD

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